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ABSTRACT

The purpose of this study was to investigate the longitudinal effects of i/t/a and T.O. instruction on students' reading, spelling, and language abilities at the end of third grade. It was primarily concerned with determining whether the effects of early reading instruction, which were not statistically evident at the end of second grade, became significant at the end of third grade. A summary of the analyses of variance and covariance computed for the orthography used (i/t/a or T.O.) suggested that i/t/a produces significantly better reading achievement in word study skills and word recognition and that i/t/a children spell as well as T.O. children by the end of third grade. From the data collected the author concluded that no significant advantage accrues to a total group from beginning reading instruction on a universal basis prior to first grade and that the Initial Teaching Alphabet proved to be a superior medium of instruction regardless of the time at which instruction began. However, i/t/a superiorities were not consistently evident in the area of comprehension. References are included. (NH)

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# BEGINNING READING--
# THE EFFECTIVENESS OF i.t.a. AND T.O.

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## A Final Report for 1964-1968
## The Results at the End of Third Grade

Harold J. Tanyzer
Harvey Alpert
Lenore Sandel

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# BEGINNING READING--

# THE EFFECTIVENESS OF I.T.A. AND T.O.

## A Final Report for 1964-1968
## The Results at the End of Third Grade

Principal Investigators

Harold J. Tanyzer
Harvey Alpert
Lenore Sandel

July, 1968
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125 Jericho Turnpike, Jericho, New York
11753

1969

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| SUPERINTENDENT | DISTRICT |
|---|---|
| Dr. Richard S. Byers | Rockville Centre |
| Robert W. Carbonaro | Valley Stream #24 |
| Dr. Jack P. Hornbach | South Huntington |
| George H. McVey, Acting | East Meadow |
| John F. Mineur | Island Park |
| Dr. Hobart F. Mossman | Locust Valley |
| Dr. Michael V. Santopolo | Hewlett/Woodmere |
| Dr. Robert F. Savitt | Plainview |
| Anthony Varuolo | Seaford |

| PRINCIPAL | SCHOOL | DISTRICT |
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| Anthony J. Cirillo | Jamaica Avenue Elementary | Plainview |
| Robert E. Clark | Audubon Elementary | Island Park |
| Dr. Philip J. Cosgrove | Morris School | Rockville Centre |
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| Dr. Ann MacArthur | Locust Valley Elementary | Locust Valley |
| Robert McNutt | Central Elementary | South Huntington |
| Remo Perrini | Corona Avenue | Valley Stream #13 |
| Miss Helen Snyder | Seaford Harbor | Seaford |
| Albert Tyler | Meadowbrook Elementary | East Meadow |
| Roy R. Waite | Bowling Green | East Meadow |
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| RESEARCH OFFICER | DISTRICT |
|---|---|
| Miss Mary Miller, Curriculum Coordinator Grades Kindergarten--3 | East Meadow |
| Beauford Batty | Island Park |
| Mrs. Mary Opal Clark | Locust Valley |
| Theodore Constantine | Seaford |
| Robert Goldstein | Plainview |
| Mrs. Marilyn List | Hewlett/Woodmere |
| Miss Dorothy Liles | East Meadow |
| Mrs. Irene Menegan | Valley Stream #13 |
| Mrs. Marion Moss | South Huntington |
| Mrs. Dorothy Owens | East Meadow |
| Mrs. Lorraine Rosenberg | Seaford |
| Mrs. Selma Stahl | Valley Stream #24 |
| Joseph Tucker | Seaford |

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| TEACHERS | DISTRICT |
|---|---|
| Mrs. Leah Alterman | Rockville Centre |
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| Mrs. Esther Tanner | Island Park |
| Mrs. Rose Turner | Seaford |
| Mrs. Sadie Waters | Plainview |
| Miss Kay Weiszmiller | Rockville Centre |
| Miss Lois Wetzel | East Meadow |
| Mrs. Lenore Wieder | Island Park |
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Lenore Sandel

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# CHAPTER I

## STATEMENT OF THE PROBLEM UNDER STUDY

### Problem

The major objectives of this study were to answer these questions:

1. Do children taught to read in kindergarten, as compared to those starting in first grade, achieve significantly higher attainments in reading, spelling, and language over a period of years, at least through the primary grades?
2. Does the variation in the printed language medium used in teaching children to read significantly alter the degree of achievement in reading and spelling?
3. Does intelligence, as measured by the Pintner-Cunningham Primary Test, influence the comparisons of reading achievement made in each medium and at each grade level (kindergarten and first grade)?

One of the most controversial issues in the field of reading is the question: "Should children be taught to read before the traditional starting point of first grade?" In general, the majority of public schools in the United States answer this question directly by postponing the beginning of formal reading instruction until first grade. In recent years, however, there has been an increasing trend to start reading instruction earlier. Thus, Mary Austin (1963), in a field study sponsored by the Carnegie Foundation, reported that more than one quarter of the communities with kindergartens began formal reading in kindergarten.

Whether it is educationally sound and in the best interests of children to introduce reading instruction at the kindergarten level is a moot question. It is generally recognized that multiple factors and conditions influence a child's performance in reading. Moreover, children exhibit a wide range of differences in learning capacity and state of readiness. Each child, in turn, is likely to show varying degrees of readiness in those factors related to learning to read. The unique growth and maturational patterns of each child and his particular needs, interests, and abilities preclude, therefore, designating an arbitrary grade or age as the most appropriate starting point for beginning reading instruction. Under ideal circumstances reading should be taught when the child is ready for it. Following this line of reasoning, the program would be tailored to meet the instructional needs of the individual child and not vice versa.

Hence, in the present study, kindergarten teachers were instructed to follow their normal readiness program in the September 1964 to January 1965 period, except in specific situations where the teacher felt that there was no question about the child's maturity and readiness. The readiness program during this period was an informal one, designed to develop language, motor, visual, and auditory experience as well as social acclimation to classroom experience. Because of the wide variations in the readiness of individual children, teachers were informed that in the January to June period it was not necessary to place all children in a formal readiness or reading program. The teacher's judgment and consultation with the research staff were utilized in determining which children should be excluded from the more formal program of that period. For the vast majority of the kindergarten population, the readiness program usually reserved for the first part of first grade was instituted. Those children who successfully completed this readiness program were introduced to formal reading instruction in either i.t.a. or T.O. The data on those children who were introduced to formal reading, those who were in a formal reading readiness program, and those who remained in an informal readiness program for the entire year will be presented under the Analysis of Results.

In current school practice the kindergarten is usually reserved for developing readiness for reading through an extension and integration of experience in language, motor, visual, and auditory skills. The first grade is primarily concerned with the teaching of reading from the standpoint of systematic and sequential instruction in word recognition and comprehension. There is a considerable body of knowledge to support such practices, not the least of which is research suggesting that the earlier the introduction of reading instruction the greater is the probability of reading failure. Most of this research indicates that immaturity is the general factor that produces reading failure in the early years, but these studies have been based on reading in traditional orthography.

The phonic inconsistencies and irregularities of English orthography may be a source of major difficulty for the young child in learning to read. This complexity in the printed language medium makes it difficult for the young child to associate symbols and meaning, to see and remember essential differences between elements, and to associate symbols and sounds. In a more logical printed medium, however--a medium such as the Initial Teaching Alphabet (i.t.a.), in which there is a highly consistent phoneme-grapheme correspondence--it may be possible to decrease the difficulty of the problem-solving task of breaking the code and thus reduce the effects of immaturity upon learning to read.

Learning to read involves the child's ability to focus his attention upon the internal letter characteristics of words. Even in teaching procedures in which the whole word is used as the stimulus, it is possible that children who learn to identify the word as a whole are aware of the letters in the word and are, therefore, capable of distinguishing other words that have similar configurations from words they have already learned. A consistent and more rational language medium such as i.t.a. may make it more feasible, less confusing, and easier for a child to focus his energies upon differentiating the characteristics of a word instead of treating it as a whole. Therefore, in this study, the major objective was to determine whether beginning reading instruction at the kindergarten level in i.t.a., which is a more regular medium, would result in significantly higher attainments in reading and spelling through the primary grades, than achievements in these areas of children who were initially taught to read in kindergarten in traditional orthography. In addition, the second major question under investigation was to determine whether beginning reading instruction in i.t.a. or T.O., at the kindergarten level, resulted in higher reading and spelling achievement through the primary grades, than that of children whose initial instruction in the two media began at the first-grade level.

In line with the above reasoning the following hypotheses were tested in the study:

### Hypotheses

1. Introducing a consistent medium such as i.t.a. to kindergarten children in a formal reading program will result in significantly better reading and spelling achievement than that attained by children who learn in traditional orthography (T.O.) in kindergarten, when both groups of children are measured at the end of third grade.
2. Introducing a consistent medium such as i.t.a. to kindergarten children will result in significantly better reading and spelling achievement than that attained by children who begin formal reading instruction in first grade in i.t.a. when both groups are measured at the end of third grade.
3. Introducing reading in traditional orthography to kindergarten children will not result in significantly better reading and spelling achievement than that attained by children who are formally introduced to reading in T.O. in first grade when both groups are measured at the end of third grade.

4. Introducing reading in i.t.a. to kindergarten children will result in significantly better reading and spelling achievement than that attained by children who are formally introduced to reading in first grade in T.O. when both groups are measured at the end of third grade.
5. Introducing i.t.a. to first-grade children will result in significantly better reading and spelling achievement than that attained by children who begin formal reading in kindergarten in T.O. when both groups are measured at the end of third grade.
6. Introducing i.t.a. to first-grade children will result in significantly better reading and spelling achievement than that attained by children who begin formal reading in first grade in T.O. when both groups are measured at the end of third grade.

# CHAPTER II

## RELATED STUDIES

### Early Reading Instruction

Differing viewpoints divide educators on the issue of early reading instruction and, specifically, on whether it is desirable to introduce formal reading activities at the kindergarten level rather than in first grade, the traditional starting point for teaching beginning reading. Evidence that very young children can be taught to read has been demonstrated in the experiments of O.K. Moore with a number of preschool children, some as young as two years. Durkin (1961) identified and followed the progress of forty-nine children who had some ability in reading upon entering first grade. The evidence was, however, inconclusive as to the efficacy of teaching reading to five-year-old children or whether early reading instruction produces beneficial and lasting results.

Brzeinski (in Figurel, 1965) compared the progress of Denver Public School children who were taught beginning reading in kindergarten with progress made by children who had a conventional kindergarten program without formal reading instruction. He found that the kindergarten children who received early reading instruction were superior readers at the end of the first, second, and third grades when compared to children who received no formal reading instruction in kindergarten.

However, premature reading instruction is generally acknowledged as the principal cause of confusion in learning to read. There is considerable evidence from studies in the areas of visual and auditory perception which indicates that many children below a mental age of approximately six and one-half years may be too immature to distinguish small differences among a number of different shapes, remember details within words, perceive and remember word sounds, and associate the printed shapes with their word sounds. Sheldon's (1962) general conclusion, drawn from studies and observations of five-year-old children in their learning situation and from longitudinal studies of the effects of early learning, is that "there seems to be little or no justification for introducing reading in the curriculum at the kindergarten or five-year-old stage."

The first large-scale study of i.t.a., and probably the one most publicized, was conducted in Great Britain, beginning in 1961, under the direction of J. A. Downing. Downing (1967) evaluated the reading achievement of two groups of children, ranging between the ages of four and one-half through six, with the experimental group instructed in the i.t.a. medium and the control group in the regular alphabet. A salient feature in the research design was that both the experimental and control populations used a basal reading series (Janet and John) identical in content and differing only in the alphabetic medium. Thus the instructional materials were held constant, thereby permitting the evaluation of the alphabet as the critical variable. After one year, the data showed that children in the i.t.a. sample obtained significantly higher scores on a word recognition measure, given in the i.t.a. medium, than did the control group on the same measure administered in traditional orthography. This result would seem to suggest that the consistencies of the initial teaching alphabet pose fewer problems for beginning readers than the inconsistencies of traditional orthography. At the end of three years of instruction, the results show that children who had been initially taught in i.t.a. were approximately six months ahead in reading age on the Neale Analysis of Reading Ability (T.O. version) when compared to children who had been taught in T.O. from the very beginning of their schooling. Downing also reported that i.t.a. pupils spelled better in conventional orthography than did the control group.

The generalized conclusions reached by Downing were:

1. i.t.a. as an example of a transitional writing-system for beginning reading and writing in English generally produces superior results in t.o. reading, and in t.o. spelling by the end of the third year of school.
2. The success of i.t.a. in improving t.o. literacy skills occurs in spite of an important setback in the growth of these basic skills at the stage of transition from i.t.a. to t.o.
3. The traditional orthography of English is a serious cause of difficulty in the early stages of learning to read and write.

During the 1964-65 school year, the United States Office of Education sponsored the largest cooperative research study in first-grade reading instruction ever undertaken in this country. Five of the twenty-seven individual projects compared the relative effectiveness of reading programs using the initial teaching alphabet with various other programs of basal readers and materials all employing the regular alphabet, but differing in content, approach and amount of phonics instruction and emphasis. The Stanford Achievement Test (T.O. edition) was used as the end-of-year criterion measure of reading achievement. Since the U.S.O.E. cooperative study was only of one year's duration, a large percentage of the children in the i.t.a. groups had not made the transition at the time of the final testing. The term transition was seldom defined in the individual studies, but the definition implied is that the children in the i.t.a. groups had completed the instructional program of a particular set of i.t.a. basal readers. Fry (1965) compared three different reading approaches: (1) the Early-to-Read i.t.a. program, (2) the T.O. edition of the Sheldon Readers, and (3) the Diacritical Marking System (DMS) using the Sheldon Readers (with diacritical marks to make each word phonetically regular). He reported no significant differences between the mean scores on any of the reading subtests for the three groups in his study. In the area of spelling (using T.O. spelling as the criterion), the i.t.a. group scored significantly lower than the other groups. However, when i.t.a. spellings were accepted, there was no significant difference. At the time of the final evaluation forty percent of the i.t.a. population were reported to have made the transition to T.O.

Hahn (1965) evaluated the reading achievement of 905 first-grade children who were assigned to each of three experimental groups: (1) a British i.t.a. reading series entitled the Downing Readers, (2) a language-experience approach using experience stories and charts supplemented by trade books and phonics material (Speech to Print Phonics), and (3) a T.O. basal reading program. It was found that both the i.t.a. and language-experience groups scored significantly higher than the basal group on the word recognition subtest of the Stanford Achievement Test. No significant differences were observed on the Paragraph Meaning, Vocabulary, and Word Study Skills subtests. Eighty percent of the i.t.a. group was reported to have made the transition when the Stanford Achievement Test was administered in May.

Hayes (1966) investigated the effectiveness of four reading programs which included (1) the Early-to-Read i.t.a. series, (2) the Scott, Foresman basal readers, (3) the Scott, Foresman readers supplemented with phonics and word power, and (4) the Lippincott basal readers, a T.O. series emphasizing phonics instruction. The findings were not uniformly consistent but generally tended to favor the Lippincott and i.t.a. groups over the other approaches in overall reading achievement. The i.t.a. and Lippincott subjects scored significantly higher than pupils in the other two groups on the Stanford Achievement subtests of Word Reading, Paragraph Meaning and Word Study Skills. At the time of final testing at the end of the year, seventy-four percent of the i.t.a. group had made the transition to T.O.

Mazurkiewicz (1965), in a study comparing the reading performance of i.t.a.-taught children versus children who were instructed in T.O. basal materials, found no significant differences on any of the reading subtests. The only significant differences was observed in spelling with the T.O. group superior to the i.t.a. group. Fifty-four percent of the i.t.a. children had made the transition to T.O. at the time the Stanford Achievement Test was administered.

Tanyzer and Alpert (1965) investigated the effectiveness of three different basal reading systems. The programs were (1) the Early-to-Read i.t.a. series, (2) the Lippincott basal readers, and (3) the Scott, Foresman series. Approximately sixty percent of the i.t.a. children had made the transition to T.O. at the time the reading achievement measure was administered. Generally, the results showed that the i.t.a. and

Lippincott groups scored significantly higher in word recognition, word analysis and comprehension than did the Scott, Foresman group. No significant differences were found between the mean scores for the Lippincott and i.t.a. pupils on the subtests of Word Reading, Paragraph Meaning and Word Study Skills. The Lippincott approach scored significantly higher on the spelling subtest than either the i.t.a. or the Scott, Foresman groups.

The findings at the end of the one year studies can be summarized as follows: In general, the i.t.a. and T.O. basal approaches (both conventional programs and those emphasizing intensive phonics instruction) were of approximately equal effectiveness in the area of comprehension. However, in the areas of word recognition and word analysis, the i.t.a.-taught children tended to be superior to children taught in the traditional basal programs, and performed as well as pupils instructed in the phonics emphasis approach (Lippincott). The i.t.a. pupils were generally inferior in spelling at the end of first grade when standard spelling was used as the criterion.

Fry (1967b), Hayes and Wuest (1967), Hahn (1967), and Mazurkiewicz (1967), reported the results of the second-grade extension of their first-grade reading studies. It should be noted that the programs and instructional materials following the transition from i.t.a. to T.O. varied considerably during the second grade. Hayes and Wuest found that the inferiority in spelling reported for the i.t.a. group was no longer evident at the end of second grade. In general, the results indicated that for children of average and high intelligence, instruction in the

Lippincott phonic/linguistic program or instruction in i.t.a. followed by the Treasury of Literature Series (following transition) resulted in generally higher scores in Word Study Skills and Paragraph Meaning than did instruction in the Scott, Foresman basal series. Fry's results were similar to those obtained by Hayes and Wuest in the area of spelling with no significant differences reported at the end of the second grade in that area, as compared to significant inferiority for the i.t.a. children at the end of first grade. Fry did not discover significant differences in other areas of reading between groups instructed in i.t.a. and those instructed in T.O. Hahn, reporting on the second grade results of his study, found that the use of the Initial Teaching Alphabet had not given children an advantage over those using a comparable instructional program in traditional orthography. However, in no case did he find the i.t.a. chil[illegible] inferior to those instructed in T.O. In contrast to the results reported by Hahn, Mazurkiewicz found that at the end of the second grade a matched sample of i.t.a. children spell better, write better, achieve higher levels in word recognition, and have higher comprehension levels as indicated by reader level achievement. However, he reported that word recognition superiority evident at the end of second grade is not retained at the end of the third grade, and that standardized achievement tests do not reveal higher comprehension levels for the i.t.a. population when compared to the T.O. population. Reporting on the results at the end of the second grade for the entire sample, Mazurkiewicz found no significant differences between i.t.a.- and T.O.-taught groups on any of the Stanford Reading and Spelling subtests. Fry (1967a) reporting on the results of his study extended into third grade, found that there were no significant differences on any of the reading and spelling subtests of the Stanford Achievement Test among the three treatment groups.

Shapiro and Willford (1968) compared the relative effectiveness of initiating formal reading instruction in i.t.a. at a kindergarten level versus first grade. The investigators found that at the end of both the first and second grades children who began formal reading instruction in kindergarten obtained significantly higher scores in word recognition, paragraph meaning, spelling and word study skills than the group who began reading instruction in first grade.

Dykstra (1968) reported the findings of those first-grade reading projects which were continued as follow-up studies in second grade. These were previously cited as individual investigations earlier in this chapter. Comparing T.O. basal series versus i.t.a. programs, Dykstra summarized the results as follows:

> Pupils taught in basal programs and pupils taught in i.t.a. programs did not differ significantly in reading comprehension at the end of second grade. The two groups likewise did not differ in rate of reading. In general, the differences between the two groups in English usage and in mechanics of punctuation were also found to be chance differences. However, pupils whose initial instruction in reading used the initial teaching alphabet were significantly superior in word recognition skills and spelling skills at the end of second grade. Pupils in the i.t.a. treatment were significantly superior in performance on the Stanford Word Meaning Test, the Fry Test of Phonetically Regular Words, and the Gates test of high frequency words. Furthermore, significant differences favored the i.t.a. group on the Stanford Spelling Test. It appeared that the use of a regular code for initial instruction in reading produced better than average ability to decode the printed word and encode the spoken language.

# CHAPTER III

# PROCEDURES

## The Program of Instruction or Activity

The present study was initiated during the 1964-65 school year. In terms of the objectives of this study, four groups of children were taught by different orthographies, i.t.a. and T.O., at different grade levels, kindergarten and first grade, in each of eleven selected school districts. Each school district contributed from two to eight kindergarten and first-grade classes to which children were heterogeneously assigned. Since selection was random and the size of the total sample was large, it was assumed the sample was somewhat representative of the Long Island public school population. The sample was composed of four groups, as follows:

Group 1: kindergarten---beginning reading instruction in T.O.;
Group 2: kindergarten---beginning reading instruction by i.t.a.;
Group 3: first grade---taught to read in T.O.;
Group 4: first grade---taught to read by i.t.a.

At the completion of the first year of this study, each of these four groups was moved up one grade. The instruction given to the administrative officers of the schools was to move each class, as a unit, to the following grade. Thus, the four groups evaluated during the second year of the study were as follows:

Group 1: first grade---continued reading instruction in traditional orthography, following the completion of kindergarten;

Group 2: first grade---continued reading instruction in i.t.a., after having begun reading instruction in kindergarten;

Group 3: second grade---continued reading instruction in traditional orthography;

Group 4: second grade---continued reading instruction in i.t.a.

In the third year of the study, each of these four groups was moved up one grade. For those children moving from first to second grade, the instruction given to the administrative offices of the schools was to move each class as a unit to the following grade. However, those groups advancing from second to third grade were not moved as a unit since, at that point, all children in the i.t.a. group had made transition and were being instructed in traditional orthography. Hence, children moved to third grade were randomly assigned to any third-grade class so that the third-grade classes were composed of children whose initial instruction began in first grade in i.t.a., and those whose initial instruction began in T.O., as well as children who are not part of the study. This was accomplished to increase the class sizes to a normal number for administrative purposes. Children who are part of this study were identified to the research staff, but were not made known to the teachers. The teachers were able to elicit this information from records but were encouraged not to do so. Thus, the four groups being evaluated during the third year were as follows:

Group 1: second grade--continued reading instruction in traditional orthography following the completion of kindergarten and first grade;

Group 2: second grade--continued reading instruction in i.t.a., or T.O. if they had made the transition, after having begun reading instruction in kindergarten and continued in first grade;

Group 3: third grade--continued reading instruction in traditional orthography with reading instruction initially introduced at first-grade level;

Group 4: third grade--continued reading instruction in T.O., but were originally instructed in i.t.a., beginning at a first-grade level.

During the fourth and final year of the study those children completing third grade, groups one and two, were evaluated.

### Teacher Training Workshops

During the first year of this study participating teachers attended a three-day workshop designed to provide a theoretical basis and practical application of approved methods of teaching reading in T.O. and i.t.a. Professors on the Hofstra University Reading Center staff served as workshop instructors.

Separate sessions were held for kindergarten and first-grade teachers. Kindergarten teachers were encouraged to develop a sound readiness program which would include language activities and experiences stressing all aspects of a child's total growth and development. During the workshop methods on differentiating instruction were presented to all the teachers. Emphasis was placed on adapting instruction to the learning needs of children varying in levels of ability and rates of learning.

During the second year of this study the first-grade teachers participating in the first year of the study were assigned to work with the new first-grade classes which were formed from the previous year's kindergarten population. In a few instances the first-grade teacher moved with her class to the second grade, since this was the policy of the school in which the teacher was employed. Since no second-grade teachers were part of the first year's study, they were selected and trained by procedures similar to those used with the previous year's first-grade teachers. This involved a three-day workshop for all second-grade teachers who volunteered for the study. These three days, April 27, June 4, and June 7, were utilized for instruction in i.t.a. and in the procedures used in post-transition activities. In the current phase of the study most of the teachers who would be teaching in i.t.a. or T.O. classes had been trained in the previous year. In cases where additional second-grade teachers were needed, these teachers were assigned to a workshop that was similar to that given in the preceding year. These teachers were volunteers for addition to the experiment, but did not know whether they would be assigned to an i.t.a. or T.O. class at the time of the workshop. Third-grade teachers did not attend any workshop since at that point reading instruction was to continue normally. Children whose initial instruction was in i.t.a. or in T.O. were mixed in all classes. Teachers attending workshops were trained in the techniques of teaching reading and in the implementation of their curricula. Consideration was given to each of the following proposals for differentiating instruction:

Differences in levels of ability: Basal readers and instructional materials (commercial and teacher-made) would be adapted to the abilities of the children.

Differences in rates of progress: Children would progress at different rates with respect to skills development. Flexible grouping procedures would be emphasized with groups changing in membership as individual progress warranted the change. Children would work in groups, in pairs, or by themselves, depending on the purpose of the activity and the learning needs of the children.

Differences in skills needs: Methods of evaluating and analyzing reading difficulties would be stressed. Teachers would be encouraged to prepare extensive practice materials, when feasible, in order to correct specific deficiencies; and to form groups on the basis of pupils' specific needs or performance in various reading skills.

Individualizing reading: The better readers would be encouraged to do more independent recreational reading in easy and interesting materials. Provision for individual teacher-pupil conferences would be made when it was appropriate, as in evaluating a child's reading, giving help in a particular skill, and so forth.

During the second year of the study, research officers from each district attended the second and third days of the workshop. Since there was no change in research officers for the current phase of the study, they were not required to attend the workshop during the current year. Those additional second-grade teachers volunteering for the study were assigned to workshop sessions and were not aware of whether they would be assigned to i.t.a. or T.O. classes. In the second-grade workshops, in addition to the four major areas emphasizing differentiation of instruction, stress was placed on a vertically oriented reading program. This meant that teachers were instructed to ascertain the reading levels of the pupils within their classes and to begin their instructional program at those levels, whether this might mean instructing children at levels below second grade in difficulty or above second grade in difficulty.

During the third and fourth years of the study an orientation session was held with all third-grade teachers to inform them that they were to follow similar procedures in developing reading by a vertically oriented plan. Third-grade teachers as well were informed that they were to ascertain reading levels of pupils and to begin their instructional programs at those levels. Second- and third-grade teachers were informed to consider individual differences among children above the high and low end of reading levels instead of the usual procedure of differentiating instruction for children reading at levels below grade, but not allowing children to read at levels above grade whether they were capable of this or not.

## Teacher's Log

During the first year of the study, a teacher's log was developed by the research staff and distributed to the teachers. Each teacher was asked to record the daily program related to reading instruction and ancillary language arts activities. Since the teachers' logs were to be analyzed for time study, the design of the log provided for noting the activity, materials, and duration of time spent on each activity. A code was used to designate the various reading and ancillary activities.

For each instructional or ancillary activity taught during the day, teachers were directed to record the amount of time in clock hours. The research staff noted that teachers were more aware of the specific reading act and other supportive activities that comprise a balanced reading program. This factor may tend to increase the teachers' effectiveness and skill. A comparison of daily time schedules was made by the Hofstra research staff to ensure that the same amount of time was being devoted to reading instruction in T.O. and i.t.a. classes.

Since the teachers experienced some difficulty in maintaining accurate logs during the first year of the study, during the second year the log was modified from the previous one to contain the following information:

1. time spent in each activity;
2. type of learning activity--reading skill or related activity;

3. classroom organization.

During the first year of the study, the teachers submitted their logs weekly, but commencing March 1 only a record of the first week of each month was required. During the second year, however, to improve the degree of instructional control, teachers were asked to keep logs of their activities in reading instruction and related activities for only three complete weeks of the school year. The third-grade teachers were asked to keep logs for only two complete weeks of the school year. These three weeks were separated so that a sample of the teachers' activities near the beginning, middle and end of the year was obtained. Third-grade logs were obtained for the fall and spring. During the weeks that teachers were keeping the logs, a member of the research staff visited each teacher's classroom and intensively observed the teaching of the reading lesson. During these observations the research staff member completed her own log for the instructional period observed. The logs prepared by the research staff were compared with the teachers' own reports to insure the validity of the log. The results of the teachers' logs are analyzed under the heading Analysis of the Data for the fourth year of the study. The results of the teachers' logs for the first three years of the study are presented in the Appendix and an inspection of these data will reveal that the time spent in reading instruction and related activities, as well as the classroom organization, for each treatment group were relatively similar in each of the first three years.

## Testing Program

During the first year of the study reading readiness (Metropolitan Readiness Tests) and intelligence measures (Pintner-Cunningham Primary Test) were administered in the initial phase of the study. Research officers, appointed in each school district, were given instructions in the administration and scoring of the tests. They were responsible for the testing program and were assisted by other members of the staff of each school (psychologist, reading specialist, supervisors). Teachers were not involved in administering the tests, but served as proctors.

First-grade children were tested during the last week in September and first week in October. Kindergarten testing was scheduled for the first two weeks in November to permit children to become oriented to the school situation.

During the second year the Detroit Word Recognition Test was administered in March to all first-grade students in the study. This test was also administered during the first year, so that comparisons of results between the present first-grade children who had had a year of kindergarten experience, with some instruction in reading or formal readiness, could be compared to the first-grade population of last year, who had no formal reading instruction in kindergarten. The results of the Detroit Word Recognition Test given in the first year of the study to first graders, and during the second year of the study, to those children who were then in first grade are reported in Appendix C. The end-of-year testing for the second-grade children was the

Stanford Achievement Test, Primary Battery II, Form X, and for the children completing third grade, the Stanford Achievement Test, Primary Battery II, Form W. At the end of the first and second years of the study, the year-end test utilized for children completing first grade was the Stanford Primary Battery I, Form X. In addition, another intelligence test was administered to all third-grade children involved in the study since intelligence tests administered at a first-grade level are more subject to error than are tests administered at this age. To avoid the possibility that reading achievement might influence this second result, the test chosen was nonverbal. The test administered to the third-grade children was the Pintner-Durost Elementary Test, Scale 1, Form B, copyright 1941. Hence, statistical comparisons by intelligence for third-grade children utilized the new intelligence test score. When comparisons were made between those children completing second grade and those completing third grade, the initial measure of intelligence was used. In the last phase of the study, since all children were completing third grade, all comparisons utilized the more recent measure of intelligence.

## Scoring of Tests

In administering the testing program, the research officers instructed the teachers in the scoring of tests. Because of the difficulties encountered in scoring during the first year of this study--which resulted in the research staff having to rescore all of the tests--after all tests were completed, the tests were returned to the research office where they were scored by Hofstra research assistants. This is the same procedure which had to be used during the entire length of the study. After the research assistants completed the scoring, papers were exchanged and every fifth test of each class was rescored and checked for accuracy. If errors were found in scoring all the tests of that class were rescored. All tests administered during the fourth year, as was true during the first three years of the study, were administered by individuals experienced in testing programs. Teachers did not administer any tests, but served only as proctors.

## Meetings with Teachers and Research Officers

A meeting of all research officers of the school districts participating in the fourth and final year of the study was held on Thursday, March 21st, 1968. The agenda included information and instructions relating to the end-of-year testing. Details of the testing schedule and procedures were explained at that meeting. During the previous years in the study, periodic and separate meetings were held with the first-grade and second-grade T.O. and i.t.a. teachers. During those meetings, teachers were encouraged to discuss problems relating to their instructional program, and to share suggestions for teaching reading, creative writing, and other activities which supported the language arts program. This type of meeting was not necessary during the final phase of this study since the third-grade classroom teachers had both i.t.a. and T.O. children with their classes and were generally unaware of which children had been instructed initially in either of the two media. Research officers were sent periodic memos to remind them of the importance of adhering to the experimental conditions of the study and to inform them of testing procedures.

## The Reading Program

The actual instructional program which occurred in the classes was evaluated from the teachers' reports and their logs and from the supervisory reports of the research officers in their schools, supplemented by the class observations of the Hofstra staff. In the first three years of the study the teachers' logs, verified by the observations of the Hofstra staff, revealed that i.t.a. and T.O. teachers adhered with reasonable closeness to the experimental conditions (Appendix N). A statistical test was applied to determine whether any differences existed in instructional time between i.t.a. and T.O. teachers. For each of the first three years of the study there were no significant differences between the two groups in time spent in direct reading instruction and in related activities. The results of the examination of the fourth year's teachers' logs are described in the chapter, Analysis of the Data.

During the first year of the study the groups learning to read in T.O. were taught by varying methods, depending upon classroom teachers' preferences. The teachers were allowed to utilize procedures of teaching that were generally approved by language arts specialists. Thus, teachers instructing in T.O. could use a basal or multibasal approach, or could use an experience approach utilizing library books as the core of their instructional program. The type of classroom organization used by a teacher was a matter of individual preference, as long as the type of organization was designed to differentiate instruction within the class. Since second- and third-grade teachers were chosen on the basis of their competence, as long as proper differentiation of instruction occurred, all materials printed in T.O. which the teacher believed increased teaching effectiveness were approved. Third-grade teachers were not selected for the study. Instead, all third-grade teachers within the school system were assigned children who had initially been in i.t.a. or T.O., on a random basis. Thus, at the third-grade level, the teacher variable was controlled through randomization.

The i.t.a. classes were taught to read using a series of graded materials printed in i.t.a., entitled the Early-to-Read i.t.a. series. This series consists of a set of books, beginning with readiness material, six readers, four workbooks, and an alphabet book which accompanies the readers, a set of teacher's manuals, and large alphabet and word cards. In addition, approximately seventy-five British and American library books printed in i.t.a. were available. A number of juvenile books were transliterated into i.t.a. by the Hofstra staff. Transliterations were printed in the form of inserts which were pasted over the pages of the regular T.O. edition. Teachers were allowed to use any of these supplementary materials in terms of their own preferences.

The readiness materials incorporate a program which stresses an experience story approach and early and intensive phonics instruction. Pupils are taught to recognize and associate each symbol of the Initial Teaching Alphabet with its speech equivalent. The last book in the series is the transition reader which is printed in conventional orthography. Pupils are given training in examining and relating the most common spelling patterns in T.O. for each of the forty-four characters of the Initial Teaching Alphabet. The teachers using the i.t.a. materials were instructed to use the same approved forms of differentiating instruction as were utilized by the T.O. teachers.

Within each classroom, a minimum of fifty library books was available for pupil use. These books were changed periodically during the school year. The books covered a wide range of interests and reading levels. In the Initial Teaching Alphabet classrooms, the books were written in the i.t.a. medium. The Hofstra observational staff saw to it that this condition was met within each classroom.

Whole class activities were carried on when they seemed appropriate, as in introducing new concepts, word meanings, or reading skills. In addition, the following types of related activities and learning aids were used with the whole class: (1) listening to stories and poems read or told by the teacher; (2) group dramatization of a story; (3) use of the flannel board for acting out a story; and (4) use of recordings, filmstrips, and motion pictures to develop new concepts, learnings, and understandings. The teachers' logs plus observations substantiated that these activities were carried on.

The time schedule that teachers in the i.t.a. and T.O. classes were asked to follow in terms of the daily amounts of time to devote to reading instruction and other activities related to reading was as follows:

Second Grade: Approximately one hour per day for reading instruction and one hour and thirty minutes per day for related activities (personal reading by children, story telling, dramatization, spelling, reading in other subjects, etc.).

Third Grade: Approximately one hour per day for reading instruction and one hour and thirty minutes per day for related activities (personal reading by children, story telling, dramatization, spelling, reading in other subjects, etc.). All instruction at the third-grade level was in T.O.

In the first two years of the study, the instructional and related activities time that the teachers were directed to follow was:

First Grade: Approximately one hour per day for reading instruction and one hour and thirty minutes per day for related activities (personal reading by children, story telling, dramatization, spelling, reading and other subjects, etc.).

Kindergarten: No specific time allotment was recommended because of the wide range of differences in maturity and readiness for reading instruction that exists among children at the kindergarten level. Teachers were encouraged to plan activities in accordance with and appropriate to the developing needs and abilities of the children. Emphasis was placed on planning a program with a flexible time schedule. Fifteen to twenty minutes was recommended as the maximum amount of time for reading instruction and approximately one hour for related readiness activities.

## Selection of the Sample

During the first year of the study eleven Long Island school districts were selected for the study on the basis of promised cooperation with the experimental conditions of the study. During the first year of the study (September 1964 to June 1965) each of the eleven school districts contributed from two to eight kindergarten and first-grade classes for the study. The distribution of the school districts and the number of classes which they contributed at each grade level in that time period is shown in Appendix D. Cooperating districts were advised that assignment of children to kindergarten and first-grade classes would be accomplished on a purely random basis to assure heterogeneity in each classroom. Since the selection was random and the size of the total sample was large, it was assumed the sample was somewhat representative of the Long Island population. Descriptive data on the first-year population are included in Appendix E to allow readers of the report the opportunity to evaluate the results of this study in terms of whether the populations in their areas are similar to the population of this study. It should be understood that results obtained are pertinent only for similar populations. During the second year, the administrative officer of each of the participating schools was informed that the first-grade i.t.a. and the first-grade T.O. classes, as of June 1965, would be moved to second grade as units. In some cases, attrition in first grade would have produced impracticably small classes. Hence, the principals were informed that additional children could be added to each of the experimental groups to bring the class size up to normal limits, but the children so added were, obviously, not included in the study. The kindergarten groups which had received i.t.a. or T.O. instruction in the September 1964 to June 1965 period were grouped within their medium of instruction. Thus, all the kindergarten i.t.a. children were grouped together, and all the kindergarten T.O. children were grouped together. From each of these groups, random assignment to first-grade classes for the September 1965 to June 1966 period was accomplished. During the third year, the administrative officer of each of the participating schools was informed that the first-grade i.t.a. and first-grade T.O. classes, both of whom had received instruction in reading in kindergarten, would be moved to second grade as units. As in the preceding year, principals were informed that additional children could be added to each of the experimental groups to bring the class size up to normal limits, but the children so added were obviously, again, not included in the study. The second-grade i.t.a. and T.O. children who had not been instructed in kindergarten were pooled at the end of second grade and were randomly assigned to third-grade teachers, so that all third-grade teachers in the school system had some children who were originally instructed in i.t.a. and some who were originally instructed in T.O. who were part of the experiment in their classes. Third-grade teachers were not informed as to which children were in the experimental groups and which children in their classes were not part of the experiment.

Since some additional teachers were required for those children moving to the second-grade level, each of the district principals was instructed to ask for teachers who would be willing to volunteer for the study with no preconceived notion as to whether they would teach in the i.t.a. or T.O. medium. From those teachers volunteering for the study, principals were instructed to match teachers on the basis of four criteria. In order to partially control for the factor of teacher effectiveness for the T.O. and i.t.a. classes, teachers were matched by the following criteria:

1. Number of years of teaching experience
2. Level of training
3. Volunteers for the experiment
4. Principal's evaluation that the teacher was competent

Within each school system teachers were selected and matched by these criteria. Tables illustrating the effects of the matching criteria for the previous second-grade T.O. and i.t.a. teachers are included in Appendix F. The results of these selection factors for teachers included in the study in the September 1964 to June 1966 period, the first and second year of this study, are included in

Appendix G. No figure is presented for the third criterion since all of the teachers volunteered for the experiment, although they were not informed as to which of the media would be utilized in their classrooms. Principals in each school had attempted to match their teachers on criteria 1, 2 and 4. These teachers were then assigned for workshop training. Following the workshop, teachers were assigned to one of the two experimental groups on a random basis. In previous years of the study, in order to control the teacher variable, an analysis of variance was computed, using the classroom as the unit of observation rather than each individual child in the total sample. However, in the third and fourth years, for the third-grade group, the unit of observation was the child rather than the classroom, since there was an insufficient number of children in each teacher's class to use the classroom as the unit of observation. The following are the groups included in the study in the fourth year:

Group 1: third-grade i.t.a. for the September 1966 to June 1967 time period (no kindergarten reading instruction);

Group 2: third-grade T.O. for the September 1966 to June 1967 time period (no kindergarten reading instruction);

Group 3: third-grade i.t.a. for the September 1967 to June 1968 time period (with kindergarten reading instruction);

Group 4: third-grade T.O. for the September 1967 to June 1968 time period (with kindergarten reading instruction).

The groups who originally learned to read in T.O. and i.t.a. were taught by varying approved methods as described under the heading, The Instructional Program. To insure that one of the approved procedures, or combination of procedures, of teaching reading was being utilized, periodic visits were made by the Hofstra research staff plus visits by the research officers assigned to each district. These observations were recorded and checked against the teachers' own reports, as given in their logs, to check the validity of the teachers' reports of activities, methods, skills taught, and type of classroom organization and the time spent on each activity with each group. The results of the validated reports of teachers' classroom activities are included in the chapter Analysis of the Data.

At the third-grade level it is obvious that careful control of the instructional program was not necessary as children were randomly assigned to classrooms and teachers regardless of the medium in which they had been originally taught. As a result, third-grade observations by the Hofstra research staff were primarily devoted to a check on the validity of teachers' reports of activities, type of classroom organization, and the time spent on each activity with each group.

## Instructional Control

In the fourth year of the study with all of the children at the third-grade level, instructional control resulted from the fact that the same teacher was teaching children whose initial instruction was in i.t.a. as well as those whose original instruction was in traditional orthography. Nevertheless, a time schedule was prepared for third-grade teachers whose classrooms contained children who were originally in i.t.a. as well as those who were originally in T.O. The time schedules suggested the amount of time allotted daily for reading instruction and support of language arts activities related to reading. The time schedule was described under the heading Program of Instruction. An evaluation of the teachers' adherence to the time schedule is reported in the Analysis of the Data.

The total sample of children in the study at the beginning and end of the year, for the September 1964 to June 1965 period, and the breakdown for each of the experimental groups are included in Appendix H. An inspection of these figures reveals that the attrition in the September 1964 to June 1965 time period was relatively small. In the second year of the study, September 1965 to June 1966, attrition for the kindergarten group, which was in first grade, was considerably greater than any of the attrition rates noticed in the preceding year. This was the result of many children attending public kindergartens in each of these districts then transferring to parochial schools for first grade. As can be seen in Tables 1 and 2, the total sample of both the first- and second-grade i.t.a. and T.O. classes for the second year was 1,288. The second year's first-grade classes in i.t.a., as of June 1966, contained 410 children, and the first-grade classes in T.O. contained 332 children. In the second-grade classes at the end of the 1965 to 1966 period, the figures were 298 and 248, for the i.t.a. and T.O. groups respectively. In the third year the total sample of second- and third-grade children was 1,078. The breakdown for the third year's second-

and third-grade children was 1,078. The breakdown for last year's second graders was 355 in i.t.a. classes and 257 in T.O. classes. For the 1966-67 third grade the sample size for those children originally instructed in i.t.a. was 260 and 206 for T.O.-instructed children. Additional attrition occurred during the fourth year for various reasons, including such factors as incomplete data caused by a child being absent on one of the testing dates, moving from the community, extended illness, a change to a parochial or other private school.

TABLE 1

DISTRIBUTION OF i.t.a. AND T.O. FIRST- AND SECOND-GRADE POPULATIONS, 1965-1966

| | i.t.a. | | T.O. | |
|---|---|---|---|---|
| | Sept. 1965 | May 1966 | Sept. 1965 | May 1966 |
| First Grade | 430 | 410 | 345 | 332 |
| Second Grade | 308 | 298 | 266 | 248 |

## TABLE 2

## DISTRIBUTION OF i.t.a. AND T.O. FIRST- AND SECOND-GRADE POPULATIONS, 1966-1967

| | i.t.a. | | T.O. | |
|---|---|---|---|---|
| | Sept. 1966 | May 1967 | Sept. 1966 | May 1967 |
| Second Grade | 410 | 355 | 345 | 257 |
| Third Grade | 298 | 260 | 248 | 206 |

The following table provides the distribution of i.t.a. and T.O. third-grade populations for the 1966-67 year and the 1967-68 year. These groups are the only ones being compared in this year of the study.

## TABLE 3

## DISTRIBUTION OF i.t.a. AND T.O. THIRD-GRADE POPULATIONS FOR THE 1966-67 YEAR AND THE 1967-68 YEAR

| Third Grade | September 1966 | May 1967 | September 1967 | May 1968 |
|---|---|---|---|---|
| i.t.a. | 326 | 260 | 355 | |
| T.O. | 288 | 206 | 257 | |

## Evaluation

Reading readiness (Metropolitan Readiness Tests) and intelligence measures (Pintner-Cunningham Primary Test) were administered in the initial phase of the study. Socioeconomic status was determined with the Sims Occupational Ratio Scale. The dependent variables in reading achievement were measured on the Stanford Reading Achievement Test, Primary I for first-grade classes and the Stanford Reading Achievement Test, Primary II for second-grade classes. Scores were obtained in word reading, paragraph meaning, word study skills and spelling on the Stanford Primary I.

The Stanford Reading Achievement Test Primary II Form X was administered to the second-grade classes and for the third-grade classes, the Stanford Reading Achievement Test Primary II Form W was administered and the following scores were obtained: word meaning, paragraph meaning, word study skills, and spelling. In addition, another intelligence test was administered to those children in third grade, and this same test was administered to the present third-grade classes. This is designed to improve the reliability of intelligence categories, as measures of intelligence at the first-grade level are more variable than those obtained at a third-grade level. The test chosen for the measure of intelligence was the Pintner-Durost Elementary Test of the General Ability Series, Scale 1: Form B Verbal. Although this is a verbal test, no reading is required, so that reading achievement should not influence the score.

All measures were administered in conventional orthography. For the second- and third-grade classes, this was totally defensible as virtually all children in the i.t.a. population had completed transition and were reading in traditional orthography by that time. However, at the conclusion of first grade, over half of the children who had been instructed in the i.t.a. medium had not made transition to traditional orthography. The decision to administer the first-grade reading test in traditional orthography was based on two general factors. The first was that the goal of i.t.a. instruction is effective reading in traditional orthography and, as a result, it was felt to be more appropriate although perhaps slightly unfair to measure the i.t.a. population in reading standard materials for which the i.t.a. was to prepare them. The second factor on which the decision was based was the lack of norms availability for the i.t.a. version of the Stanford Achievement Test Primary I. It was felt that it would not be appropriate to utilize the norms obtained on that Stanford Achievement Test in conventional orthography as a basis for comparison on the same test transliterated into i.t.a.

Teacher training and experience of third-grade teachers were not a critical factor because of the complete randomized assignment of children in the study to third-grade teachers. In the first three years of the study, however, teacher training and experience of kindergarten, first- and second-grade teachers were determined through the use of questionnaires which requested information and degrees obtained, name of college or university attended, number of years of teaching at kindergarten or grade one and other grade levels in the participating school system, and total numbers of years of teaching at kindergarten or grade one and other grade levels in all school systems. Results of this questionnaire appear in Appendix F.

During the first year of the study, since the Initial Teaching Alphabet was relatively new and most parents were relatively unfamiliar with it, parents were asked to evaluate their attitudes toward i.t.a. at the beginning of the study and at the end of the study. A questionnaire consisting of twelve questions was prepared for this purpose and is contained in Appendix I. No questionnaire was prepared for the T.O. group since the parents' attitudes toward traditional orthography had no real significance. It was, or had been, the only medium of instruction available. The second purpose of the questionnaire was to determine where parents might possibly place the blame for any reading difficulties that occurred with their children with i.t.a. In the first year, also, a questionnaire was prepared for administration to the cooperating teachers (see Appendix J.) in the i.t.a. classes to determine their general attitudes toward i.t.a. after having completed a year of teaching in the medium. The results of these questionnaires were highly favorable toward i.t.a., although certainly there were reservations exhibited, and there was a possibility that the Hawthorne Effect might have been operating in the teachers' responses as well as in the parents' responses. Since the Hawthorne Effect may be alleviated somewhat with time, it was felt that a similar questionnaire should be prepared for the second year of the study and administered to parents, teachers, and the participating administrative officers in the cooperating schools. At this point many of these teachers, administrators, and parents had utilized i.t.a. for two years. The research staff was concerned with whether any changes in attitudes were exhibited and the direction of these changes. The analysis of these questions and the teachers', parents', and administrators' responses to them will appear in Appendix K. No questionnaire was administered in the third year since very little change in attitude was exhibited in the previous two years in which the questionnaire had been administered. During the fourth year, however, a questionnaire was administered to parents, children and administrators in this final year of the study to elicit a final evaluation of attitude toward the medium of instruction. This questionnaire was distributed at the time of the final testing in May and was administered to the appropriate people following the completion of the final testing.

A form was prepared in which teachers could list the number of children at each instructional level within their classroom as of June 15, 1968. Third-grade teachers were asked to list the instructional levels for all children within their classrooms as of June of the current year, and the research staff determined which of those children had been in the experiment and compiled the data on those children only. The data are presented for the third-grade i.t.a. children and third-grade T.O. children separately although it should be remembered that all of the children in third grade were being instructed in traditional orthography. The data on instructional levels within the current third-grade classes are presented under the heading Analysis of the Data. The report on the instructional level of third-grade classes from the 1966-1967 school year are presented in Appendix L.

## Statistical Analysis

This concludes the final year of a four-year longitudinal study. It is possible at this point to determine the effect of introducing reading instruction at the kindergarten level upon reading achievement at the end of third grade. Two additional hypotheses were studied and completed at the end of the third year relating to the effect of medium (i.t.a. or T.O.) upon reading achievement. Consequently, of the six hypotheses posed in the initial study it was possible to evaluate four of the hypotheses at the end of the third year. The other two hypotheses relating to the effect of medium upon reading achievement were completed at the end of the third year. The results of the evaluation of the groups who began reading instruction in i.t.a. and/or T.O. at the first-grade level, with respect to their reading achievements at the conclusion of grade three is presented again in the final evaluation in the end-of-year results for the fourth year. For the present population who began reading instruction at the kindergarten level and who are now concluding grade three, the Pintner-Durost Intelligence Test was administered. This test, measuring verbal intelligence by non-verbal procedures so that reading achievement would not affect the scores, was administered to obtain a more reliable estimate of intelligence. Since the three categories of intelligence--low, average, and high--were determined by placing both the i.t.a. and T.O. populations together and then dividing the frequency distribution into three equal parts, the intelligence test administered in the current year would have changed the total distribution somewhat, and thereby a slightly revised three categories would be obtained. Hence, the analysis of variance for the third-grade classes who began reading instruction at the first-grade level, as well as those who began at the kindergarten level, was redone for the third-grade results, using the Pintner-Durost I.Q.'s.

Comparisons of the reading achievement of the third-grade i.t.a. children who had received kindergarten reading instruction, and third-grade T.O. children who had likewise received kindergarten reading instruction, were made as were comparisons of the reading achievement of third-grade i.t.a. and T.O. children who had not received instruction in reading at the kindergarten level. The comparisons made on all groups computed initially utilized a 3 x 2 analysis of variance design. Each year, I.Q.'s of the total sample of all of the children contained in the study, including both i.t.a. and T.O. children, were placed in an ordered frequency distribution. The whole group was then divided into three equal I.Q. categories--high, average, and low. In cases where the dividing point would have made groups unequal in size, children whose I.Q.'s were at the dividing point were randomly assigned to one of the two groups they fell between. For the first- and second-grade results the analysis of variance utilized as the unit of observation the mean of the scores within each I.Q. category within each class. Thus, there were three observations (means) for each class for each subtest. Since the third-grade children were randomly assigned to classrooms and the children who were originally instructed in i.t.a. and T.O. were mixed in the same classrooms, it was not desirable to follow the same procedure for the analysis of third-grade results. The cell numbers would have been very small, in many cases zero, and there was no method difference. As a result, the analysis of variance of the third-grade results utilizes the individual child as the unit of observation. Each subtest was treated separately as a dependent variable for each of the analyses of variance required to test the hypotheses, after an overall multivariate test (Bock, 1963) had indicated that there were significant differences between the two sets of means (i.t.a., T.O.).

The analyses of variance were then computed for the orthography used for the following groups:

1. Third-grade i.t.a. and third-grade T.O. for the September 1966 to June 1967 period.
2. A comparison of third-grade i.t.a. and third-grade T.O. children who had received kindergarten reading instruction and/or readiness activities in their respective media of instruction for the September 1967 to June 1968 period.
3. A comparison of third-grade i.t.a. without kindergarten reading experience and third-grade i.t.a. with kindergarten reading experience.
4. A comparison of third-grade T.O. children without kindergarten reading and third-grade T.O. children with kindergarten reading.
5. A comparison of third-grade i.t.a. without kindergarten reading and third-grade T.O. with kindergarten reading.
6. A comparison of third-grade i.t.a. with kindergarten reading and third-grade T.O. without kindergarten reading.

Dependent variables utilized were the subtest scores of the Stanford Primary Achievement Test, Primary II Form W for those children who had completed the third grade of reading instruction. The analysis of variance design is presented below for all comparisons of first-, second-, and third-grade reading achievement.

THE ANALYSIS OF VARIANCE DESIGN

| | Intelligence | | |
|---|---|---|---|
| | Low | Average | High |
| i.t.a. | | | |
| T.O. | | | |

ANALYSIS OF VARIANCE TABLE

| Source | Grade 1 df | Grade 2 df | Grade 3 df |
|---|---|---|---|
| Intelligence | 2 | 2 | 2 |
| Methods | 1 | 1 | 1 |
| M x I (Method x Intelligence) | 2 | 2 | 2 |
| Error (within) | (degrees of freedom vary with number of classes in the study) | | (degrees of freedom vary with number of children in the third-grade population) |

An explanation of the method of calculation used in the analysis of variance program is contained in the article, "A Computer Program for Univariate and Multivariate Analysis of Variance," by R. Darrell Bock, University of North Carolina. The specific program utilized was developed by Jeremy D. Finn, now at the School of Education, State University of New York at Buffalo. The title of the program is "Multivariance: Fortran Program for Univariate and Multivariate Analysis of Variance and Covariance," a modification of "Mesa 95-Univariate and Multivariate Analysis of Variance and Covariance: A Program for the IBM 7094 Computer." Copies of the user's manual for "Multivariance" can be obtained by writing to Dr. Finn.

# CHAPTER IV

## ANALYSIS OF THE DATA AND INTERPRETATION OF RESULTS

### Results of First- and Second-Grade Teachers' Logs: Classroom Organization

In the training workshops that preceded the first-year program, emphasis was placed on adapting instruction to the learning needs of children, with specific attention directed toward adapting the level of materials used to the ability of the children and recognition of differences in rates of progress. Adherence to these recommendations would be reflected in the amount of grouping used within the classroom. Similar workshops for the third-grade teachers also emphasized the necessity of grouping to meet individual differences. If teachers were profiting by the workshop instruction, there would have been evidence from their logs in which they reported the number of groups with which they were working. These logs were verified three times during the year--in the fall, winter and spring--by the Hofstra research staff. It would also be expected that in both second and third grades the number of groups in the classroom would increase during the year as the range of differences became greater. Table 4 reflects the number of teachers in i.t.a. and T.O. in second grade who taught the whole class, two groups, three groups, or four groups or more in the fall, winter and spring periods:

## TABLE 4

## NUMBER OF READING GROUPS REPORTED BY TEACHERS WITHIN EACH TREATMENT FALL (F), WINTER (W), SPRING (S), 1966-67

| | Number of Reading Groups | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 1 | | | 2 | | | 3 | | | 4 or more | | |
| | F | W | S | F | W | S | F | W | S | F | W | S |
| Second Grade N | | | | 3 | 2 | 1 | | | | | | |
| i.t.a. (N=24) % | | | | 12.5 | 8.3 | 4.2 | 62.5 | 66.7 | 62.5 | 25.0 | 25.0 | 33.3 |
| Second Grade N | | | | 3 | 4 | 4 | 12 | 10 | 10 | 4 | 5 | 5 |
| T.O. (N=19) % | | | | 15.8 | 21.1 | 21.1 | 63.1 | 52.6 | 52.6 | 21.1 | 26.3 | 26.3 |

As can be seen in the above table, none of the i.t.a. or T.O. teachers in the fall, winter or spring periods were teaching the entire class as a unit. The most common type of classroom organization was the use of a three-group system, although there were a sizable number of teachers by the end of the year who were utilizing a more individualized four-group system. In general, it can be seen that the instruction to individualize the instructional program was implemented to a large extent by the first- and second-grade teachers in the previous years of the study.

In the third-grade classrooms, children who were initially instructed in i.t.a. and in T.O. were mixed within the same classrooms. Hence, the report on classroom organization for third grade does not divide the i.t.a. and T.O. children into separate groups. Tables 5 and 6 provide figures for classroom organization for the fall and spring. As can be seen in Table 6, in the year 1967-68, thirteen of the fifty-seven third-grade teachers were using a whole group system. In 1966-67, eight of the third-grade teachers utilized two groups, twenty, three groups, and seven, four groups or more. The figures for the 1967-68 year indicate five teachers utilizing two groups, twenty-nine utilizing three groups, seven utilizing four groups, and two employing five groups within their class. One teacher reported using a completely individualized system and thirteen teachers reported teaching the entire class. The classroom organization tables reveal that a considerable amount of individualization was present in second and third grade. It is interesting to note that the third-grade teachers tend to individualize less within their classrooms than do second-grade teachers. This can be seen from the increased number of teachers utilizing only one group in third grade and the smaller percentage of teachers in third grade who utilized three groups or four groups or more in their classroom organization. The lack of individualization in the third-grade classes is not as extreme in actual fact as it may appear. The relatively high percentage of teachers who appear to be teaching the class as a whole (27.1%) reflects the fact that a few of the schools in the study were utilizing the Joplin plan for their class organization. Each of the teachers who was reported as teaching the class as a whole had received a restricted range group as a result of the Joplin organization. This, however, does not alter the fact that for proper individualization, grouping should take place even within a relatively homogeneous class.

## TABLE 5

## NUMBER OF READING GROUPS REPORTED BY THIRD-GRADE TEACHERS

## FALL (F), SPRING (S), 1966-67

| | | Number of Reading Groups | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | | 2 | | 3 | | 4 | |
| | | F | S | F | S | F | S | F | S |
| Third Grade | N | 13 | 13 | 9 | 8 | 19 | 20 | 7 | 7 |
| (N=48) | % | 27.1 | 27.1 | 18.8 | 16.7 | 39.6 | 41.7 | 14.5 | 14.5 |

## TABLE 6

## NUMBER OF READING GROUPS REPORTED BY THIRD-GRADE TEACHERS

## FALL (F), SPRING (S), 1967-68

| | | Number of Reading Groups | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | | 2 | | 3 | | 4 | | 5 | | Ind. | |
| | | F | S | F | S | F | S | F | S | F | S | F | S |
| Third Grade | N | 9 | 10 | 5 | 5 | 33 | 32 | 7 | 7 | 2 | 2 | 1 | 1 |
| (N=57) | % | .15 | .18 | .09 | .09 | .58 | .56 | .12 | .12 | .04 | .04 | .02 | .02 |

## Results of Third-Grade Teachers' Logs 1966-67 and 1967-68: Instructional Time

During the workshop periods, teachers in the study were requested to spend approximately 150 minutes on reading instruction and in related activities. It is important that these times be adhered to if one intends to extend generalizations made on the basis of this study to other schools in the country. During the previous years of this study it was found that these times were adhered to by teachers instructing i.t.a. classes and those instructing T.O. classes. The results of previous logs appear in Appendix N. It is also important to note that although the teachers have prime responsibility for keeping the logs of their time spent in instruction and in related activities, these times were verified through intensive observations at least twice during the school year by the research staff, and the observations made by the research staff compared to the teachers' own reports. The staff report and the teachers' reports coincided almost exactly. For the third-grade teachers in the study in 1966-67, and in 1967-68, computations were made of the mean time spent in instructional and related activities in reading as well as the standard deviation. For these groups, however, logs were kept only in the fall and spring period and during the time the teachers were keeping the logs they were verified by observation of the Hofstra research staff. Since each teacher had some i.t.a. and some T.O. children within her class, it was not necessary to break the figures down into two groups.

Table 7 presents the results for instructional and related activities time among the third-grade teachers in 1966-67 and 1967-68. As can be seen from this table, the mean time spent in direct instruction and in related activities was 162.5 minutes for last year's third-grade teachers and 182.7 minutes for this year's third-grade teachers. The difference, therefore, was 20.2 minutes more instruction in reading and related activities for those teachers who had the i.t.a. and T.O. children that began their instruction at the kindergarten level. The variability was approximately 28 minutes for the group which had not received kindergarten reading instruction and 38.2 minutes for the group which had. The frequency polygons in Figures 1 and 2 represent the degree of spread among the two third-grade groups. Because of the mean difference of 20.2 minutes the means were subjected to a t-test to determine whether this difference was significant. This resulted in a critical ratio of 3.12 which would indicate significance at beyond the .01 level of confidence. Hence, third-grade children who had been originally instructed in reading at the kindergarten level received significantly more time in direct instruction and related activities in reading than did the group which had not been instructed at the kindergarten level.

TABLE 7

SIGNIFICANCE OF THE DIFFERENCE IN MEAN TIME, IN MINUTES, SPENT IN DIRECT INSTRUCTION AND RELATED ACTIVITIES BETWEEN 1967 AND 1968 THIRD-GRADE TEACHERS

| Treatment | N | Mean(Minutes) | SD | t | Sig. |
|---|---|---|---|---|---|
| Third Grade 1966-67 | 48 | 162.5 | 27.9 | 3.12 | .01 |
| Third Grade 1967-68 | 57 | 182.7 | 38.2 | | |

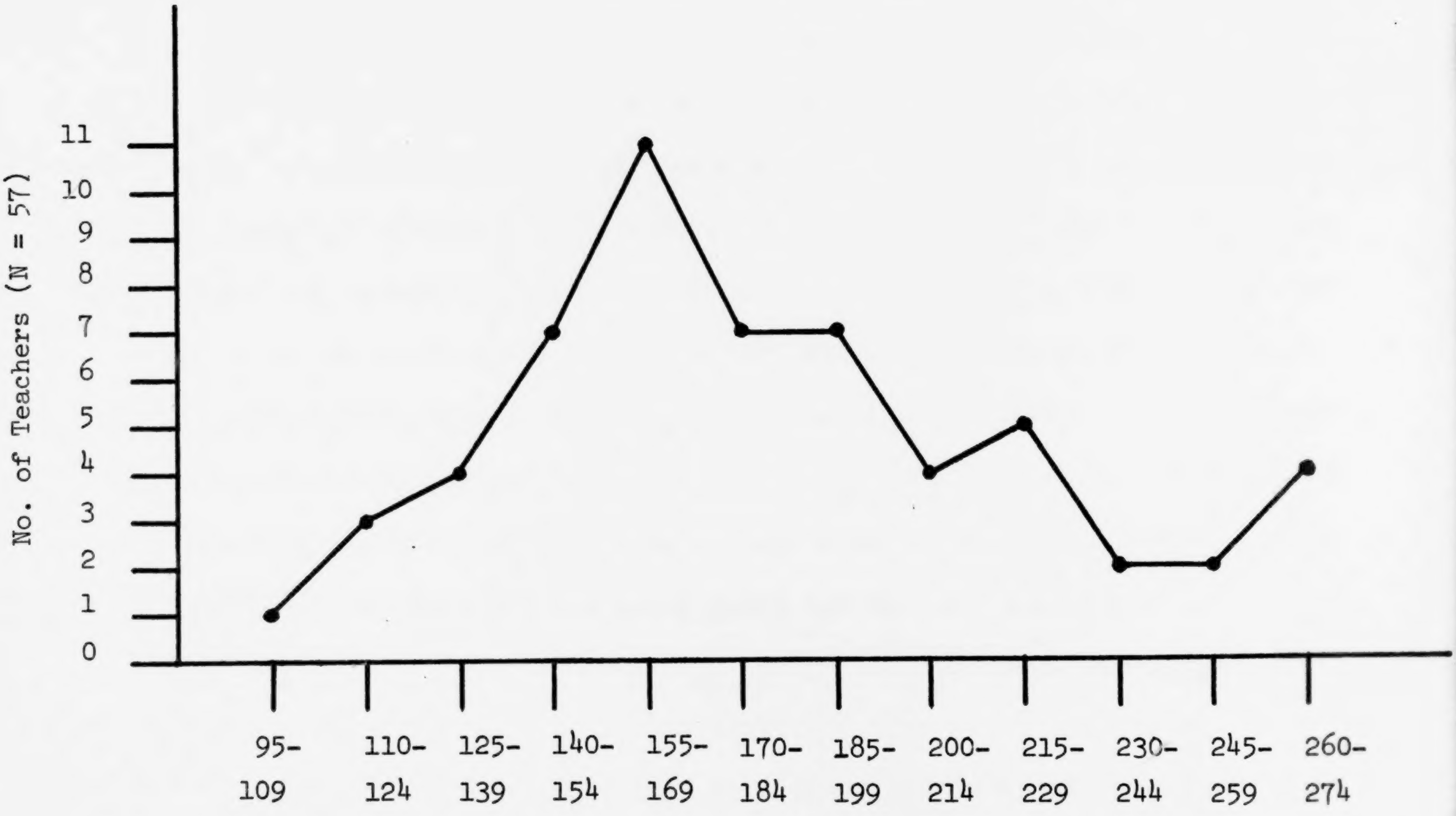

Figure 1 Average Number of Minutes Per Day Spent in Direct Reading Instruction and Related Activities Based on Two Sample Logs (Fall, Spring) of Third-Grade Teachers.

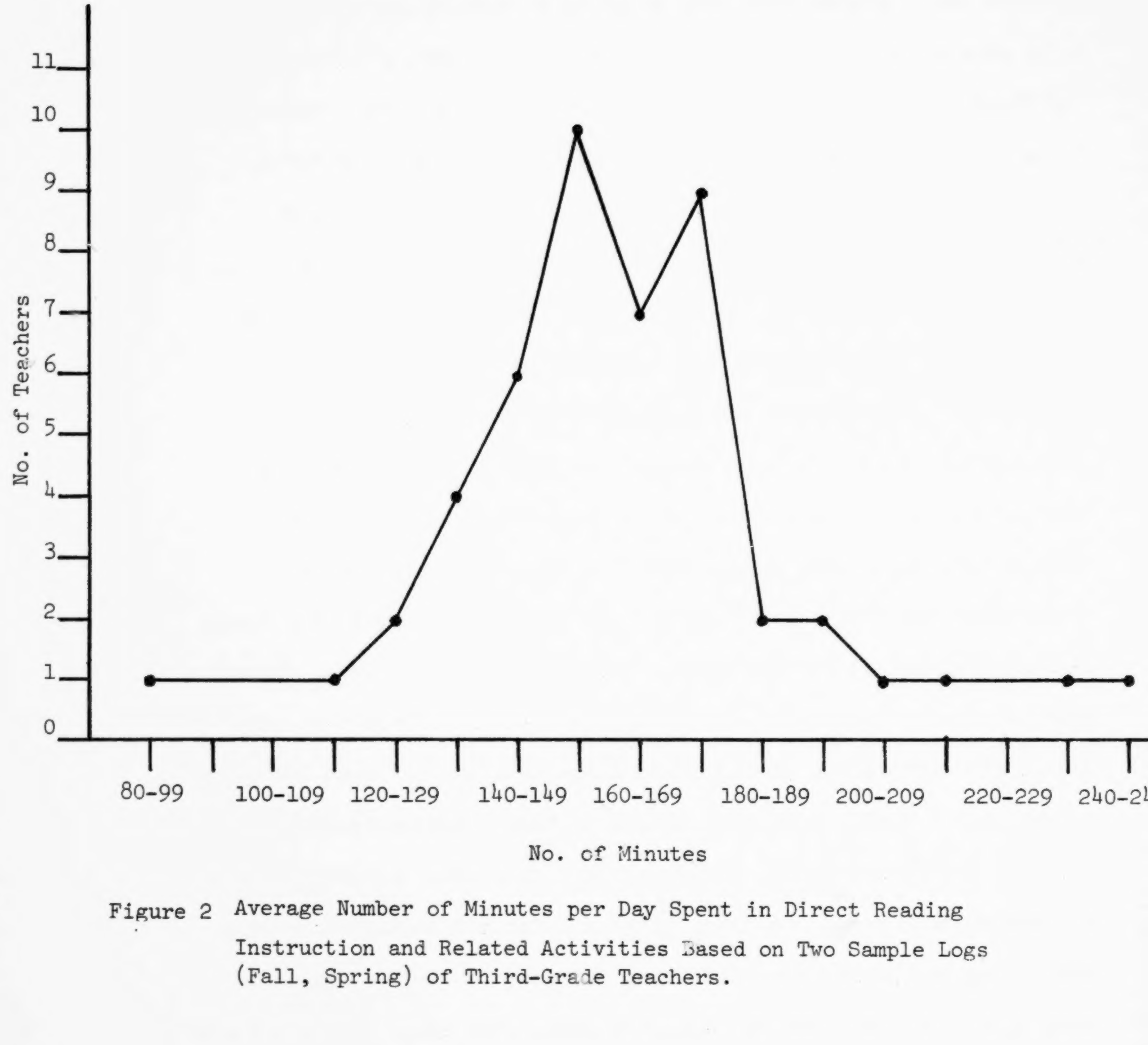

Figure 2 Average Number of Minutes per Day Spent in Direct Reading Instruction and Related Activities Based on Two Sample Logs (Fall, Spring) of Third-Grade Teachers.

## End-of-Year Reading Level: Kindergarten

Kindergarten teachers attended a workshop to provide them with the preparation necessary for introducing reading at a kindergarten level. In terms of the concepts of child development, kindergarten teachers were informed that they would be allowed to use their judgment as to whether a child was ready for the specific task of reading. In the first third of the kindergarten year the teachers were instructed to carry on the normal familiarization with routine and the normal informal readiness program in the areas of language, visual and auditory discrimination, and developing experimental background. For children who seemed ready, instruction in formal readiness material, which in most cases involved the readiness book to be utilized with first-grade basal readers, was introduced to some children in the kindergarten class. In the teachers' judgment some children began such activities and were taken out of them because of the extreme difficulties which they encountered. In some cases the teacher anticipated the difficulties and did not begin the child in the formal readiness materials at that point. Hence, the times at which formal readiness began varied for each child. By the end of the year only 10% of the children in the i.t.a. kindergartens had not been introduced to at least a formal readiness program in basal reading readiness texts, while in T.O. kindergarten classrooms only 8% of the children were not introduced to a formal readiness program. Table 8 contains the data describing the percentage of children who were in various stages of reading at the end of the kindergarten year, June 1965. As can be seen in this table, slightly under 90% of the i.t.a. children were introduced to formal basal readiness materials or the beginning basal readers, while in the T.O. group approximately 92% of the children were introduced to such material. In the i.t.a. kindergarten classrooms slightly over 75% of the children had begun informal reading instruction in pre-primer materials. The proportion of children introduced to formal basal readers in the T.O. classrooms was approximately 45%. Hence, more children in the i.t.a. classes began reading in the basal program in kindergarten than was true of the T.O. children. In terms of the highest reading level attained, slightly under 10% of the i.t.a. children were reading at a primer level or above, while approximately 2% of the T.O. children were reading at a primer level or higher. Actually, none of the children in the T.O. kindergartens achieved a reading level higher than primer. Close to 3% of the i.t.a. children read at a first reader level or higher. The teachers were requested to make judgments as to the speed of progress and movement of children from one level to another, on the basis of the normally expected criteria, 95% word accuracy in reading and 70% minimum in comprehension. Hence, it would seem that the i.t.a. materials were easier for children at a kindergarten level, since more of these children met the criteria described before and were able to move to higher levels than was true in the T.O. classes.

TABLE 8

READING LEVELS BY PERCENTAGES OF i.t.a. AND T.O. KINDERGARTEN PUPILS

JUNE 1965

| Reader Level | Percentage of Pupils<br>i.t.a.<br>N=416 | <br>T.O.<br>N=346 |
|---|---|---|
| Book 2 (i.t.a.) | 2.7 | |
| First Reader | .3 | |
| Primer | 6.3 | 1.7 |
| Pre-Primer 2 | --- | 10.7 |
| Pre Primer 1 | 66.8 | 32.7 |
| Readiness: Basal | 13.4 | 46.5 |
| Readiness: Non-Basal | 10.5 | 8.4 |
| | 100 % | 100 % |

### End-of-Year Instructional Reading Level: First Grade

As of June 15, 1966, teachers were asked to report for their classes the basal readers which children had completed to date. The figures in Tables 9 and 10 represent the number of children who had completed successfully, by the teachers' criteria, the book at the level at which they were placed plus all preceding books in the series used. Separate illustrations are presented for first-grade i.t.a. and first-grade T.O., since the basal readers are not comparable and could not be combined.

## TABLE 9

## PERCENTAGE OF FIRST-GRADE i.t.a. PUPILS WHO HAD KINDERGARTEN INSTRUCTION AT EACH INSTRUCTIONAL READER LEVEL, MAY 1966

| Reader Level | Percentage of Pupils N=421 | |
|---|---|---|
| Readiness | .9 | .9 |
| Book 2 | 1.9 | 2.8 |
| Book 3 | 5.1 | 7.9 |
| Book 4 | 9.1 | 17.0 |
| Book 5 | 10.1 | 27.1 |
| Book 6 | 16.9 | 44.0 |
| Book 7 | 43.5 | 87.5 |
| (T.O.) Pre-Primer | .7 | 88.2 |
| Primer | .7 | 88.9 |
| First Reader | 2.7 | 91.6 |
| $2^1$ | 3.0 | 94.6 |
| $2^2$ | 4.5 | 99.1 |
| $3^1$ | .9 | 100 % |
| | 100 % | |

## TABLE 10

## PERCENTAGE OF FIRST-GRADE T.O. PUPILS WHO HAD KINDERGARTEN INSTRUCTION AT EACH INSTRUCTIONAL READER LEVEL, MAY 1966

| Reader Level | Percentage of Pupils N=331 | |
|---|---|---|
| Readiness | .3 | .3 |
| Pre-Primer | 13.9 | 14.2 |
| Primer | 29.9 | 44.1 |
| First Reader | 32.0 | 76.1 |
| $2^1$ | 16.9 | 93.0 |
| $2^2$ | 7.0 | 100 % |
| | 100 % | |

As can be seen in Tables 9 and 10, 56% of the children in first-grade i.t.a. classes were in Book 7 or had gone beyond Book 7. This represents the number of children who had made transition, since Book 7 of the i.t.a. series is written almost entirely in traditional orthography. Thus, slightly over half the i.t.a. children at completion of first grade had made transition from i.t.a. and T.O. These figures were very close to those obtained in the first year of the study, when the percentage of children who were reading in or had completed Book 7 in June of 1965 was 55%. As can also be seen in Table 9, 83% of the children had completed the first four books in the i.t.a. series (through Book 4), while 73% of the children were in Book 6 or higher. Also, 83% of the children had completed Book 6, which means that only 17% of the children had not yet reached the point of transition or were entering the transitional point. The Early-to-Read series Book 6 has a mean readability level of 3.4, with a range of 3.2 to 4.1 by the Spache Readability Formula. Since Book 7 is written almost entirely in T.O., its readability level is slightly lower than Book 6 and has been computed as 3.0. The mean readability level of Book 5 is 2.9. Hence, 83% of the children had successfully completed, by the teachers' estimates, basal books written at a high second-grade level or beyond. Since Book 2 has a readability level of 1.9 only 2.8% of the i.t.a. children were reading at levels lower than their current grade placement. Whether T.O. readability levels are similar to i.t.a. readability levels--since once the children have mastered all the symbol-sounds, they should be able to pronounce any English word--is debatable and must be interpreted cautiously.

For the first-grade T.O. classes, 76% of the children had completed all the first-grade basals or beyond. This is similar to the attainments of the children in first grade as of June 1965, when the teachers reported 77% of the children had completed all the first-grade basals or beyond. Twenty-four percent of the T.O. population were reading at levels below that expected of the average first-grade child. Hence, in the upper ranges of reading achievement readability levels in i.t.a. are comparable to readability levels in T.O. Reported readability levels of the i.t.a. children are considerably higher than those of the T.O. children. Likewise, 44% of the T.O. first-grade children were reading at levels lower than first reader, while in the i.t.a. classes only 3.5% of the children were reported at levels lower than 1.9. This seems to be additional verification that i.t.a. is an easier medium in which to read, although it should not be interpreted as indicating that i.t.a. children would read at a similar level in T.O. if transition were made at the point at which they were reading.

## End-of-Year Instructional Reading Level: Second Grade

The teachers' reports for second-grade children, as of June 15, 1966, indicated that approximately 61% of children who had been in i.t.a. classes in first grade during the previous year were reading successfully in books beyond the $2^2$ level of difficulty; whereas in the T.O. classes, only 29% of the children were reading at levels beyond the $2^2$ level of difficulty. Thirty-nine percent of the i.t.a. children were reading at levels beyond the $3^1$ level of difficulty, whereas in T.O. only 11% of the children had attained that level. Approximately 5% of the children in both the i.t.a. and T.O. groups had completed the $3^2$ reader, and approximately 5% were reading in the first half of the fourth reader in both groups. An examination of the reading attainments, in terms of the teachers' reports of reading level, can be seen in Tables 11 and 12 for the second-grade classrooms.

## TABLE 11

## PERCENTAGE OF SECOND-GRADE i.t.a. PUPILS WHO DID NOT HAVE KINDERGARTEN READING INSTRUCTION AT EACH INSTRUCTIONAL READER LEVEL, MAY 1966

| Reader Level | Percentage of Pupils N=368 | |
|---|---|---|
| $1^1$ | 1.4 | 1.4 |
| $1^2$ | 3.5 | 4.9 |
| $2^1$ | 9.2 | 14.1 |
| $2^2$ | 24.5 | 38.6 |
| $3^1$ | 22.6 | 61.2 |
| $3^2$ | 33.4 | 94.6 |
| $4^1$ | 5.4 | 100 % |
| | 100 % | |

## TABLE 12

## PERCENTAGE OF SECOND-GRADE T.O. PUPILS WHO DID NOT HAVE KINDERGARTEN READING INSTRUCTION AT EACH INSTRUCTIONAL READER LEVEL, MAY 1966

| Reader Level | Percentage of Pupils N=331 | |
|---|---|---|
| $1^1$ | .2 | .2 |
| $1^2$ | 3.7 | 3.9 |
| $2^1$ | 16.7 | 20.6 |
| $2^2$ | 50.5 | 71.1 |
| $3^1$ | 18.2 | 89.3 |
| $3^2$ | 5.5 | 94.8 |
| $4^1$ | 5.2 | 100 % |
| | 100 % | |

The teachers' reports of reading level for the i.t.a. children who had received kindergarten instruction at the end of second grade reveals that only 8% of the children were reported as having reading levels lower than $2^1$. For the T.O. group, the teachers report approximately 16% of the children who were reading at a $2^1$ level or lower. For the i.t.a. group, at the conclusion of second grade, slightly over one-third of the children were reading at grade level or lower, while the percentage for the T.O. group was slightly greater than 50% who were reading at grade level or lower. Hence, approximately 63% of the children who were instructed in i.t.a. were reading in books of a $3^1$ level of difficulty, or greater, whereas only 47% of the T.O. children were reading in books rated at levels of difficulty $3^1$ or higher. Seven per cent of the i.t.a. children were reported as having completed a $4^1$ book or higher, while only slightly over 2% of the T.O. children were reported as having completed a $3^2$ book or higher. As can be seen in Table 13, the percentages of children reading in a $1^1$ or $1^2$ level in i.t.a. and T.O. was similar. A slightly higher percentage of children instructed in T.O. was reading at a T.O. level than the percentage observed in i.t.a. Slightly over one-third of the T.O. children was being instructed in a $2^2$ book, while slightly under one-third of the i.t.a. children was reported as being instructed in a $2^2$ book. The percentage of children instructed at a $3^1$ level is similar in the i.t.a. and T.O. groups. It is at the $3^2$ level where the first major difference is observed as approximately one-fourth of the i.t.a. children was being instructed in a $3^2$ book. They had almost completed it, whereas only 11% of the children in T.O. were being instructed in a $3^2$ level, or had completed it. Approximately 7% of the

## TABLE 13

## PERCENTAGE OF SECOND-GRADE i.t.a. AND T.O. PUPILS AT EACH INSTRUCTIONAL READER LEVEL, MAY 1967

| | Percentage of Pupils | | | |
|---|---|---|---|---|
| Reader Level | i.t.a.<br>N=360 | | T.O.<br>N=265 | |
| $1^1$ | .9 | .9 | .8 | .8 |
| $1^2$ | 1.4 | 2.3 | 1.9 | 2.7 |
| $2^1$ | 5.8 | 8.1 | 13.2 | 15.9 |
| $2^2$ | 29.2 | 37.3 | 37.7 | 53.6 |
| $3^1$ | 31.4 | 68.7 | 32.8 | 86.4 |
| $3^2$ | 24.4 | 93.1 | 11.3 | 97.7 |
| $4^1$ | 6.1 | 99.2 | 2.3 | 100 % |
| $4^2$ | .8 | 100 % | | |
| | 100 % | | 100 % | |

i.t.a. children were reading at a $4^1$ level (or $4^2$ level), whereas only 2.6% of the children were reading at a $4^1$ level. Hence, the major differences that are observed in the table suggest that more children who were originally instructed in i.t.a. were reported as reading above grade than was true of children who were originally instructed in T.O. The percentages of children reading below grade were also slightly lower for the i.t.a.-instructed children as compared to the T.O.-instructed children. This can be seen in Figure 3.

Table 14 presents the results of the third-grade children who were originally instructed in i.t.a. and those originally instructed in T.O. with the end-of-year reading levels reported by the teachers. These groups began reading instruction at a first-grade level and received no formal reading instruction at a kindergarten level. Since the third-grade teachers had within their classes approximately equal percentages of children who had originally been instructed in i.t.a. and originally instructed in T.O. The end-of-year reading levels reported by these teachers should be more uniform since each teacher is applying the same criteria in determining whether a child can successfully read at a reading level to both the i.t.a. and T.O. children. From this table, it may be observed that the teachers report that approximately 14% of the i.t.a. children were reading at levels below the $3^2$ level whereas they report 19.5% of the children originally instructed in T.O. were reading at levels $3^1$ or lower. Hence, the teachers report that approximately 85% of the i.t.a. children are reading at grade level or beyond and that 80% of the T.O. children are reading at grade level or beyond.

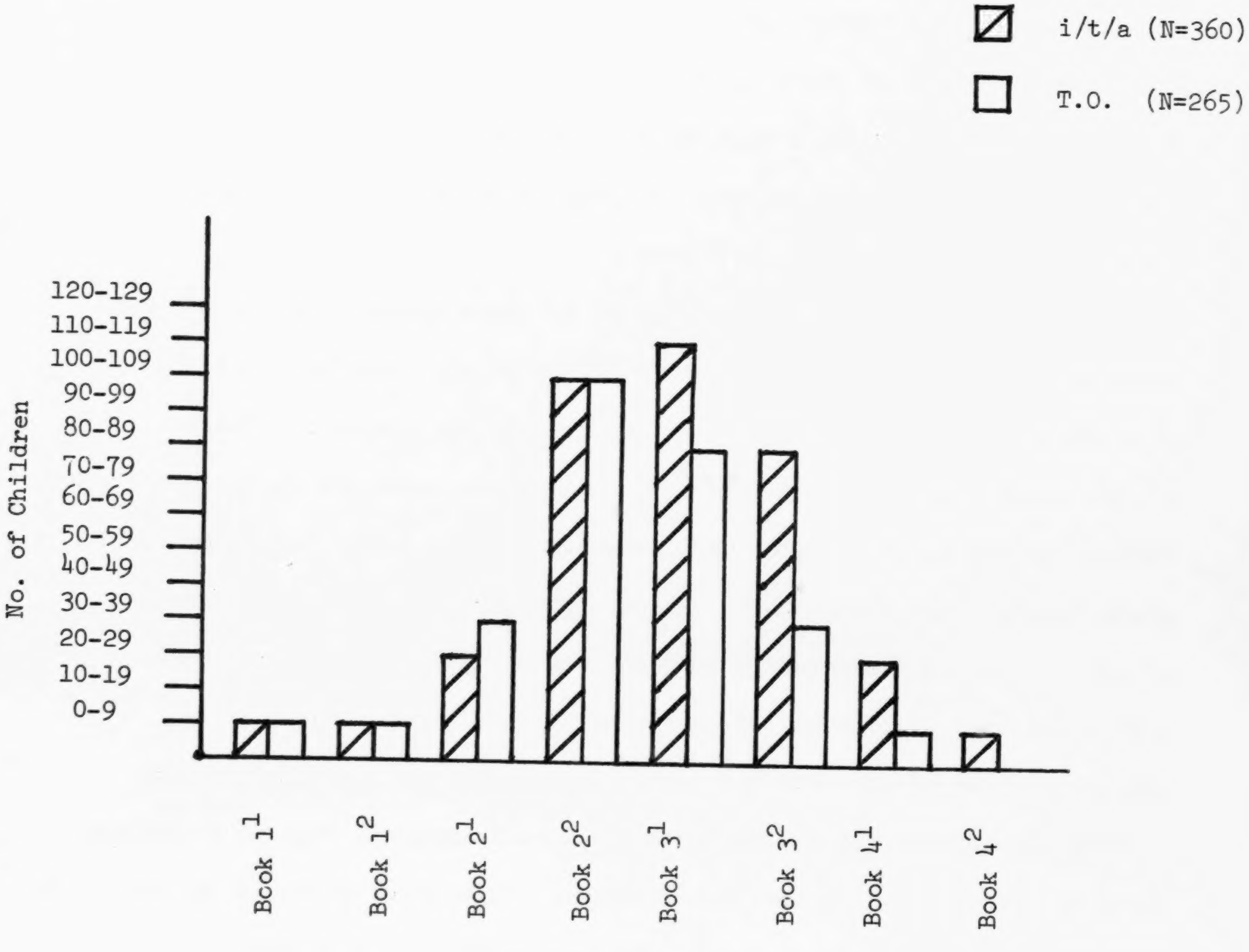

Figure 3 Instructional Reading Level of Second-Grade i.t.a. and T.O. Pupils, May 1967

TABLE 14

PERCENTAGE OF THIRD-GRADE i.t.a. AND T.O PUPILS AT EACH INSTRUCTIONAL READER LEVEL, MAY 1967

| Reader Level | Percentage of Pupils | | | |
|---|---|---|---|---|
| | i.t.a.<br>N=326 | | T.O.<br>N=288 | |
| $1^2$ | .3 | .3 | .7 | .7 |
| $2^1$ | 1.5 | 1.8 | 1.7 | 2.4 |
| $2^2$ | 4.3 | 6.1 | 4.9 | 7.3 |
| $3^1$ | 7.9 | 14.0 | 12.2 | 19.5 |
| $3^2$ | 39.6 | 53.6 | 53.1 | 72.6 |
| $4^1$ | 26.4 | 80.0 | 17.7 | 90.3 |
| $4^2$ | 8.9 | 88.9 | 3.5 | 93.8 |
| $5^1$ | 9.3 | 98.2 | 6.2 | 100 % |
| $5^2$ | .9 | 99.1 | | |
| $6^1$ | | | | |
| $6^2$ | .9 | 100 % | | |
| | 100 % | | 100 % | |

The third-grade teachers were not informed which of their children had originally been instructed in i.t.a. and which had been initially instructed in T.O. Third-grade teachers reported all of the children within their class and their reading levels as of May, and the research staff at Hofstra went through the list determining which children were in the project and which had originally been instructed in i.t.a. and T.O. and the tables were prepared by reading level.

Table 15 presents the results of the third-grade children who were originally instructed in i.t.a. and those who were originally instructed in T.O., with the end-of-year reading levels reported by the teachers as of May, 1968. These groups began reading instruction at a kindergarten level and received some formal reading instruction at that point. As can be seen in this table, 13.7 of the i.t.a. children were reading at a 3.1 level or lower while 18% of the T.O. children were reading at that level or lower. A little over 86% of the i.t.a. children were reading at grade level or higher; the comparable figure for T.O. children was 82%. Of the i.t.a. children, 29.3% were reported as reading at better than grade level while the comparable figure for the T.O. children was 29%. Of the i.t.a. children, 22% were reading at a 4.2 level whereas the comparable figure for T.O. children was 9%. Since teachers reported the figures for reading level for each child within their class and without knowledge as to which children were in the study, or which had been instructed in i.t.a. or T.O., it is reasonable to assume that the same criteria for judgment as to reading level were applied to both groups of children. General observation of the table would suggest that there were very few differences at the lower levels of reading among these third-grade children but that there was a much higher percentage of children who were initially instructed in i.t.a. at the kindergarten level who were reported reading above grade. When Tables 14 and 15 are compared it can be seen that the results for the third-grade children who had not had reading instruction at the kindergarten level and those who had, are relatively similar. The percentages are reasonably close for each reading level in both the i.t.a. and T.O. groups and these results also seem to suggest that the i.t.a. children had a higher proportion of their number who were reported as reading considerably above grade. Hence the general pattern at the third-grade level is that fewer children who were originally instructed in i.t.a. are reported as reading below grade level, and a higher percentage of children are reported as reading above grade level. This can be seen in Figures 4 and 5 for the third-grade groups of 1966-67 and 1967-68.

TABLE 15

PERCENTAGE OF THIRD-GRADE i.t.a. AND T.O. PUPILS

AT EACH INSTRUCTIONAL READER LEVEL, MAY 1968

| | Percentage of Pupils | | | |
|---|---|---|---|---|
| Reader Level | i.t.a.<br>N=325 | | T.O.<br>N=216 | |
| $1^2$ | 1. | 1. | | |
| $2^1$ | .3 | 1.3 | 1.0 | 1. |
| $2^2$ | 3.4 | 4.7 | 6. | 7. |
| $3^1$ | 9. | 13.7 | 11. | 18. |
| $3^2$ | 37. | 50.7 | 53. | 71. |
| $4^1$ | 25. | 75.7 | 20. | 91. |
| $4^2$ | 22. | 97.7 | 9. | 100% |
| $5^1$ | 2. | 99.7 | | |
| $5^2$ | .3 | 100% | | |
| | 100% | | 100% | |

Description of the Sample: Community Information

In order to accurately evaluate the data it is important to understand the communities from which the sample is drawn and also the type of teachers employed in these districts, since the Long Island area is not typical of the rest of New York State.

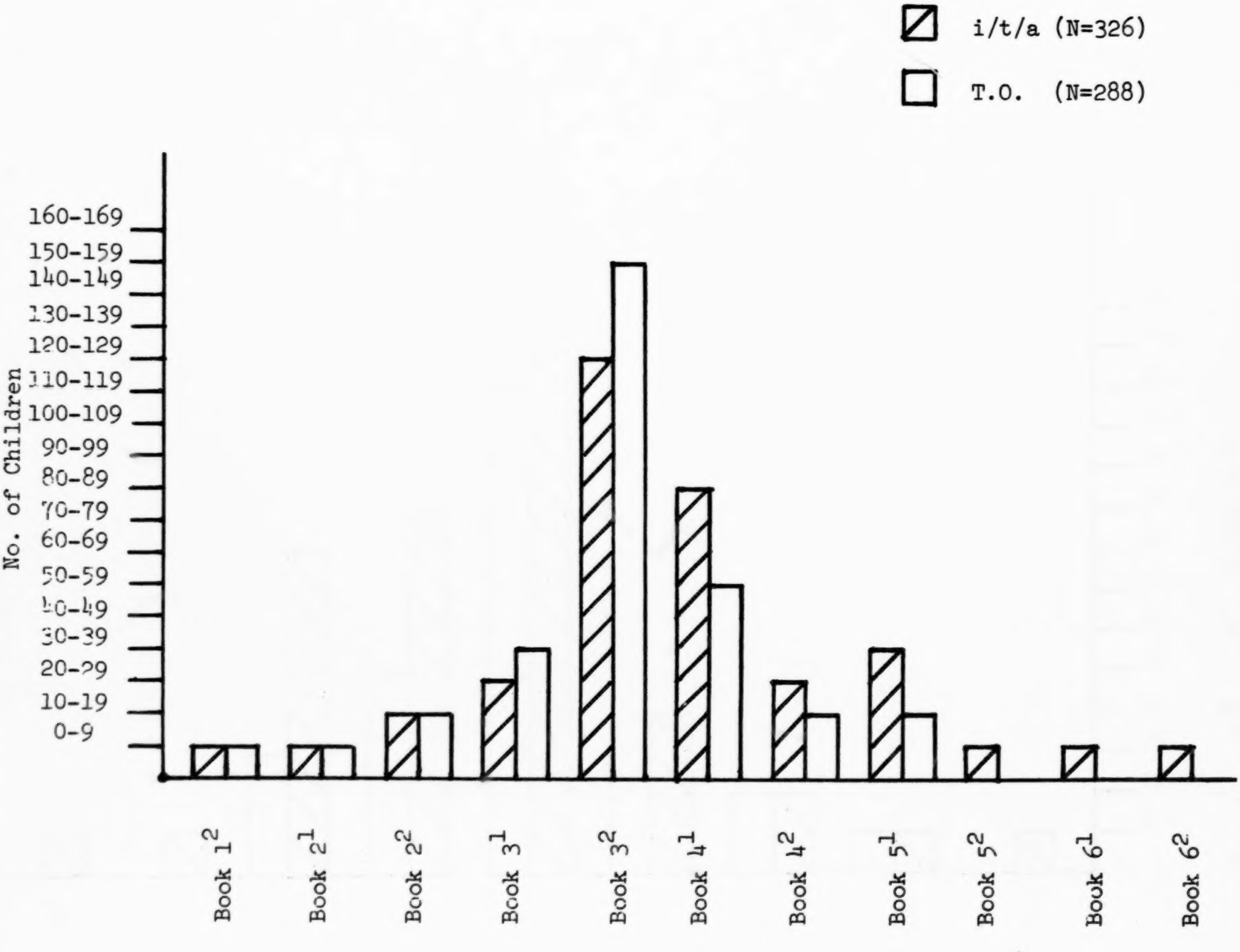

Figure 4 Instructional Reading Level of Third-Grade i.t.a. and T.O. Pupils, May 1967

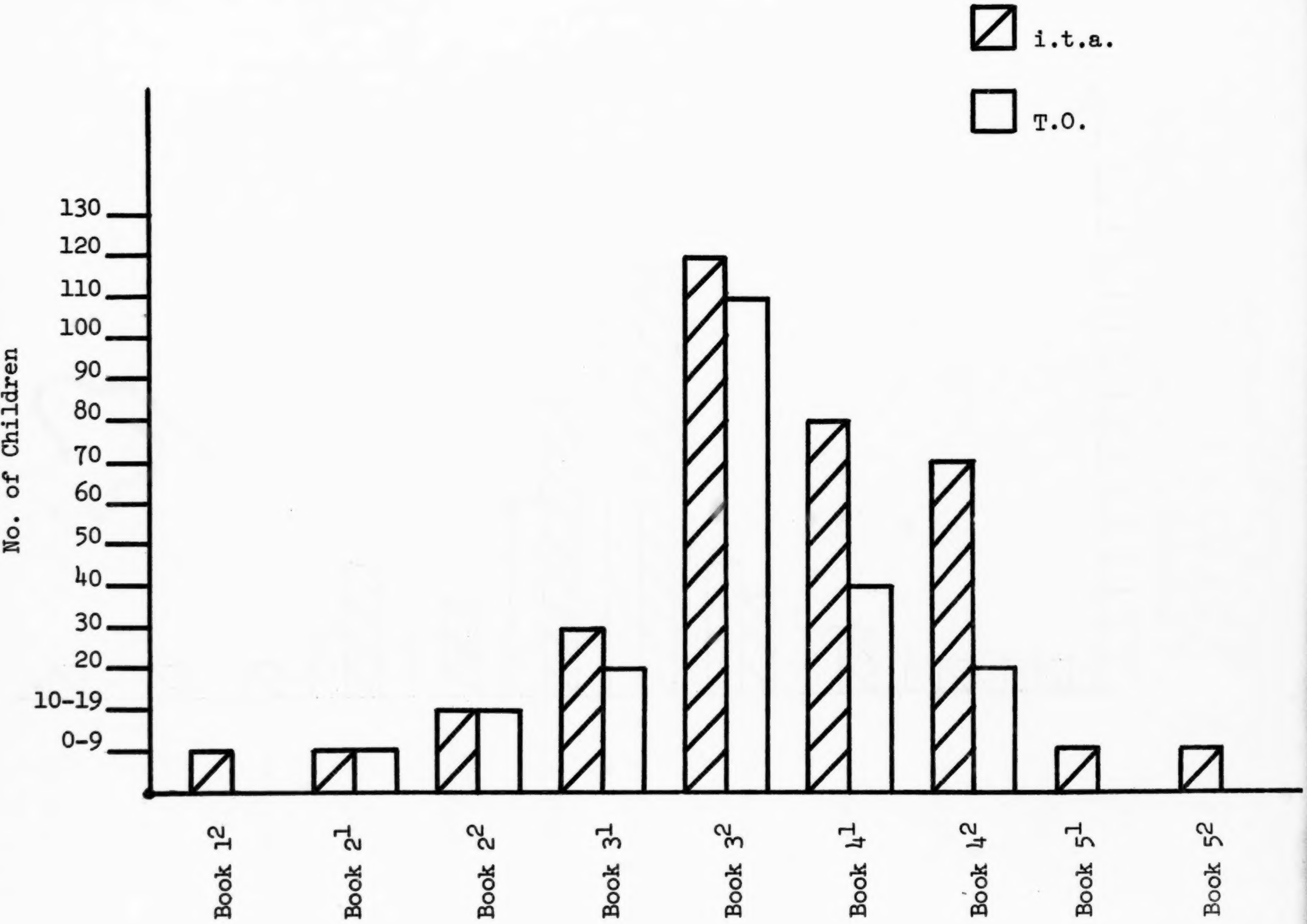

Figure 5 Instructional Reading Level of Third-Grade i.t.a. and T.O. Pupils, May, 1968.

Median number of years of education of adults*

Figure 6 illustrates the median number of years of education completed by adults living in the communities from which the sample was drawn. There were nineteen schools taken from eleven school districts represented in the study. There were variations among the schools within the districts as to median number of years of education completed by adults. This report was done by individual schools rather than total district.

From Figure 6 it can be seen that the median number of years of education completed by adults living in the community for one school was ten years, for five schools it was eleven years, for twelve schools it was twelve years, and for one school it was thirteen years. The median, therefore, for all schools was twelve years, which is higher than the median for New York State. Hence, the parents of children represented in this study had received more formal education than would be typical of the national or state population.

Median income of parents*

The graph shown in Figure 7 illustrates the median income of parents with each of the nineteen schools represented in the study. From this graph it can be seen that in three schools parents had a median income between seven and eight thousand dollars and in four schools parents had a median income of nine thousand dollars plus. The median for the total sample was, therefore, eight to nine thousand

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*1960 U. S. Census

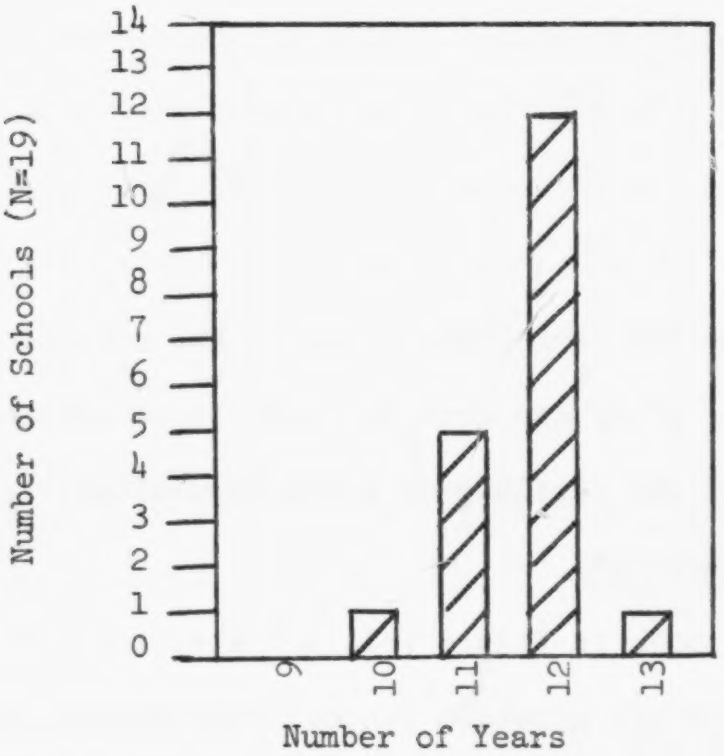

Figure 6 Median Number of Years of Education Completed by Adults.

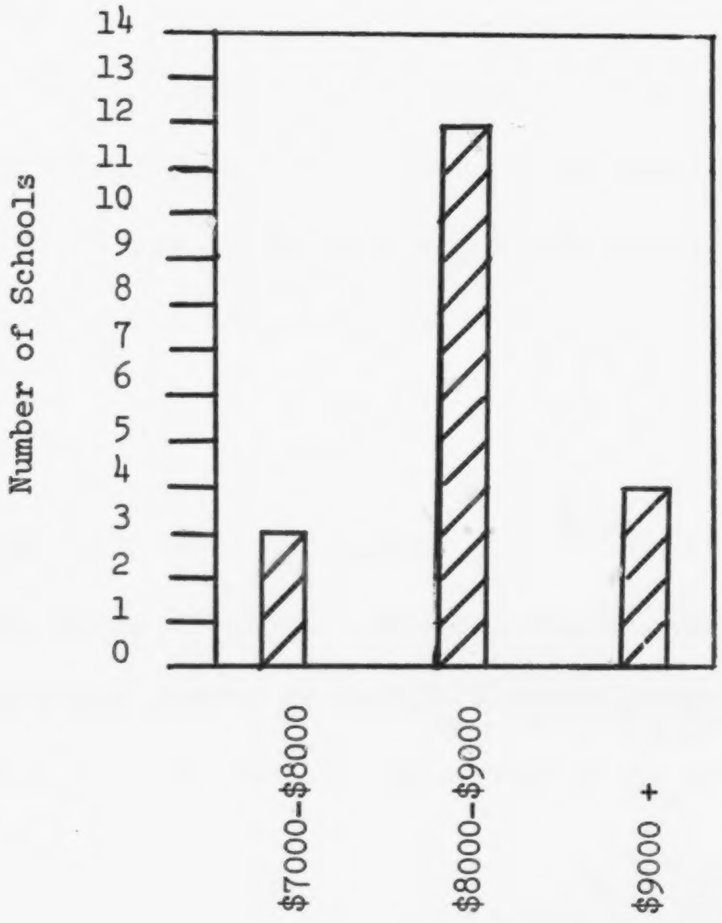

Figure 7 Median Income (N=19).

dollars. Hence, the parents of the children in the study were more affluent than would be typical of parents in general in the state or nation.

### Population of the communities*

The graph shown in Figure 8 illustrates the population of the community in which each of the nineteen schools was located. As can be seen from the graph, three of the schools were located in communities having populations between 2501 and 5000. Three of the schools were located in areas where the population was 5,001 to 10,000, six of the schools were located where the population was 10,001 to 25,000, and seven schools were in areas where the population was 25,001 to 100,000. As can be seen the median population fell in the class interval 10,001 to 25,000.

### Types of communities

The graph in Figure 9 illustrates the types of communities in which each of these schools was located. From the graph it can be seen that one community can be classified as urban, seventeen communities as suburban, and one as an incorporated village of less than 2,500 population.

### Length of school day

Of the nineteen schools cooperating in the study seven of the schools had a school day that was 4.6 to 5.0 hours in length, six hed a school day of 5.1 to 5.5 hours, five had a school day of 5.6 to 6.0

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*1960 U. S. Census

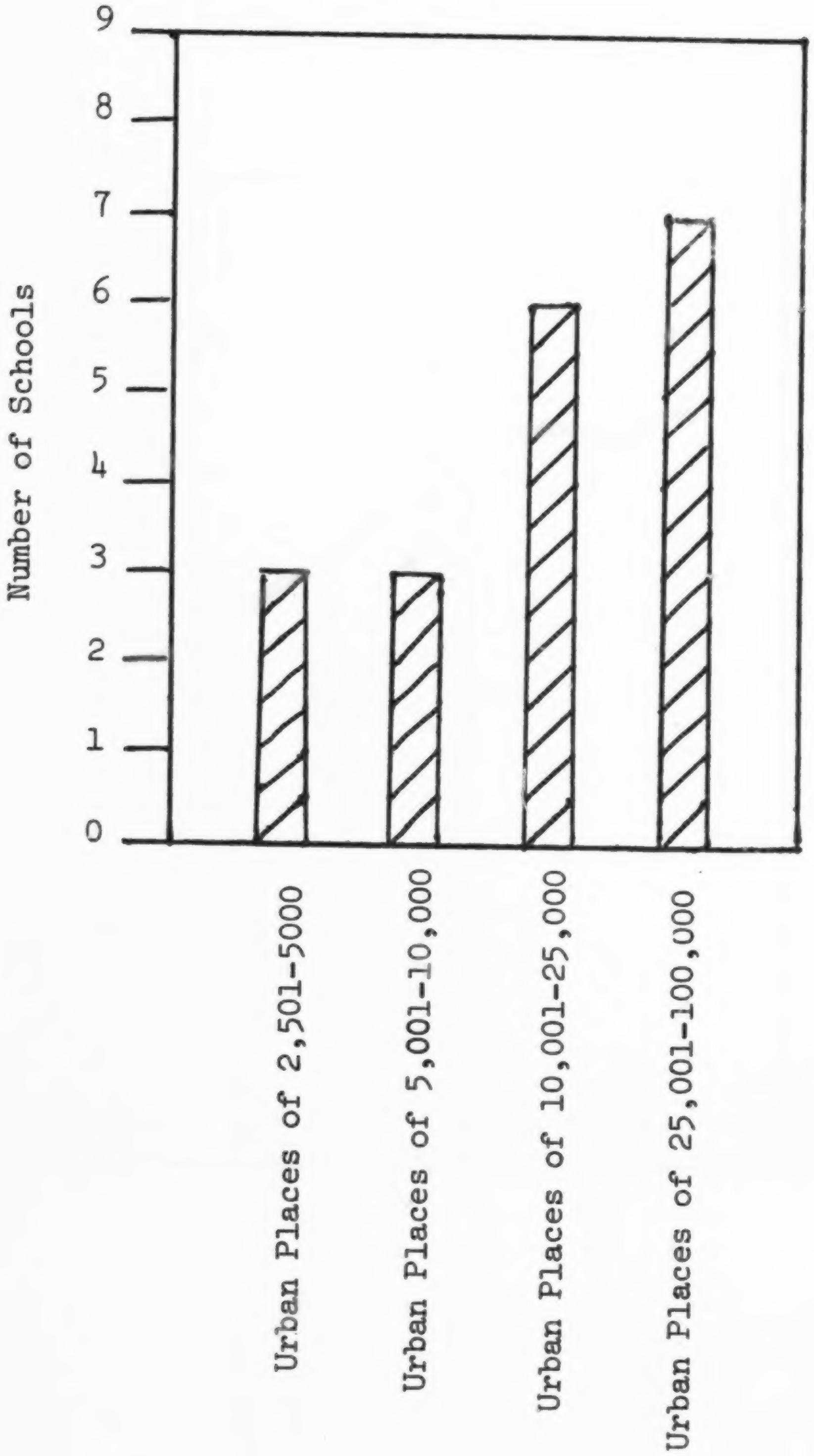

Figure 8 Population of Community in Which School is Located (N=19).

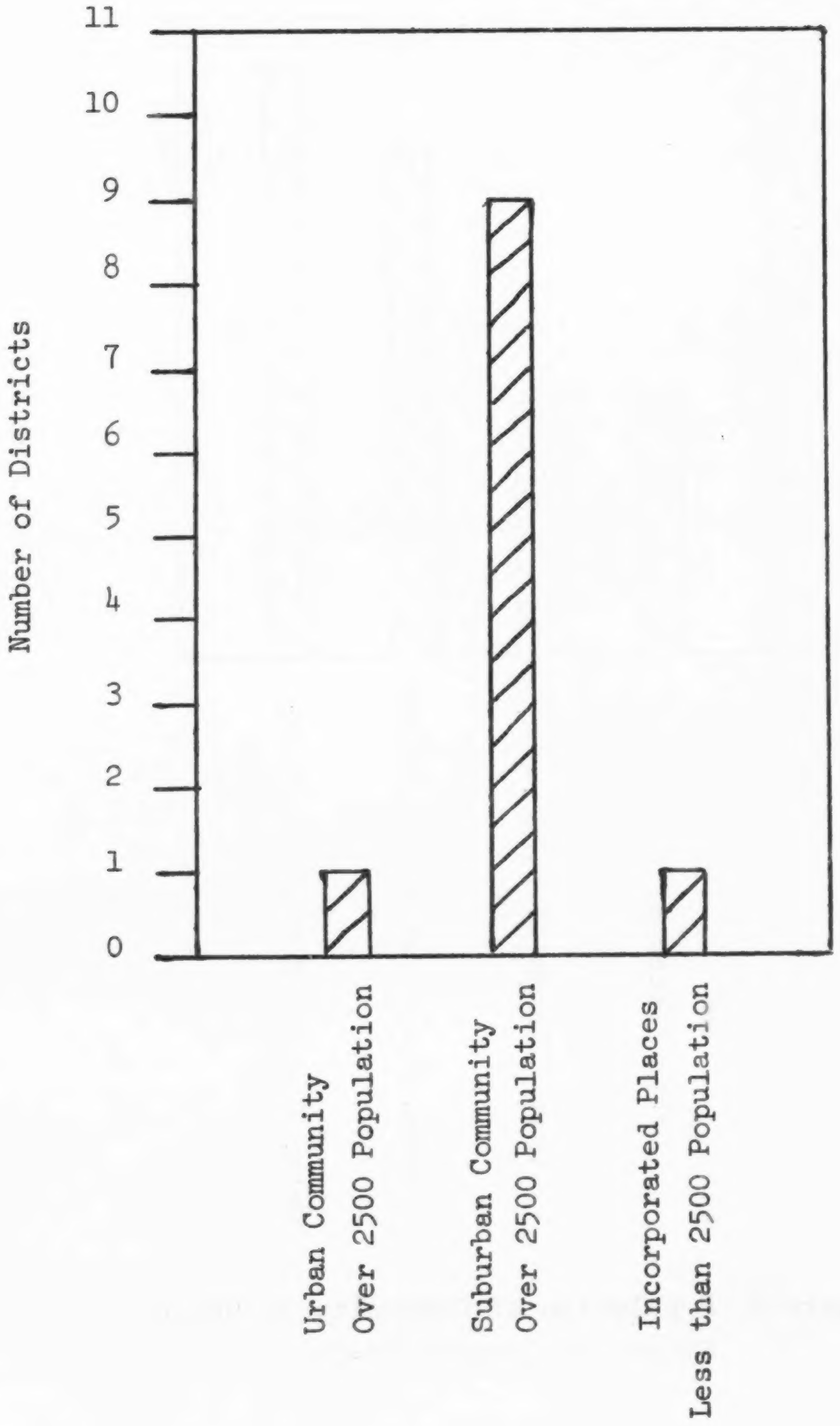

Figure 9 Type of Community (N=11).

hours, and one was 6.1 to 6.5 hours. This time variable was controlled by having i.t.a. and T.O. classes within each of the districts involved in the study; hence, when only one school was involved, having a school day as long as 6.1 to 6.5 hours, this particular school would have both i.t.a. and T.O. classes in it. The preceding data are represented in Figure 10.

### Length of school year

In terms of the length of the school year, there were very minor variations among the nineteen schools. One school had a school year of 180 days. Eleven, or the majority of the schools, had a school year ranging from 181 to 185 days, and seven schools had school years that ranged in length from 186 to 190 days.

### Number of third-grade classrooms

Some idea of the size of the schools involved in the study can be obtained from information on the number of third-grade classrooms in the districts. As can be seen in Figure 11, the largest of the ten school districts contains forty-three classrooms and the smallest contains eight. The average number of classrooms in third grade in the ten districts is twenty-one. Figure 12 shows the number of third-grade classrooms by building; the largest of the school buildings contained nine classrooms and the smallest, three. The average number of third-grade classrooms per school was slightly over four.

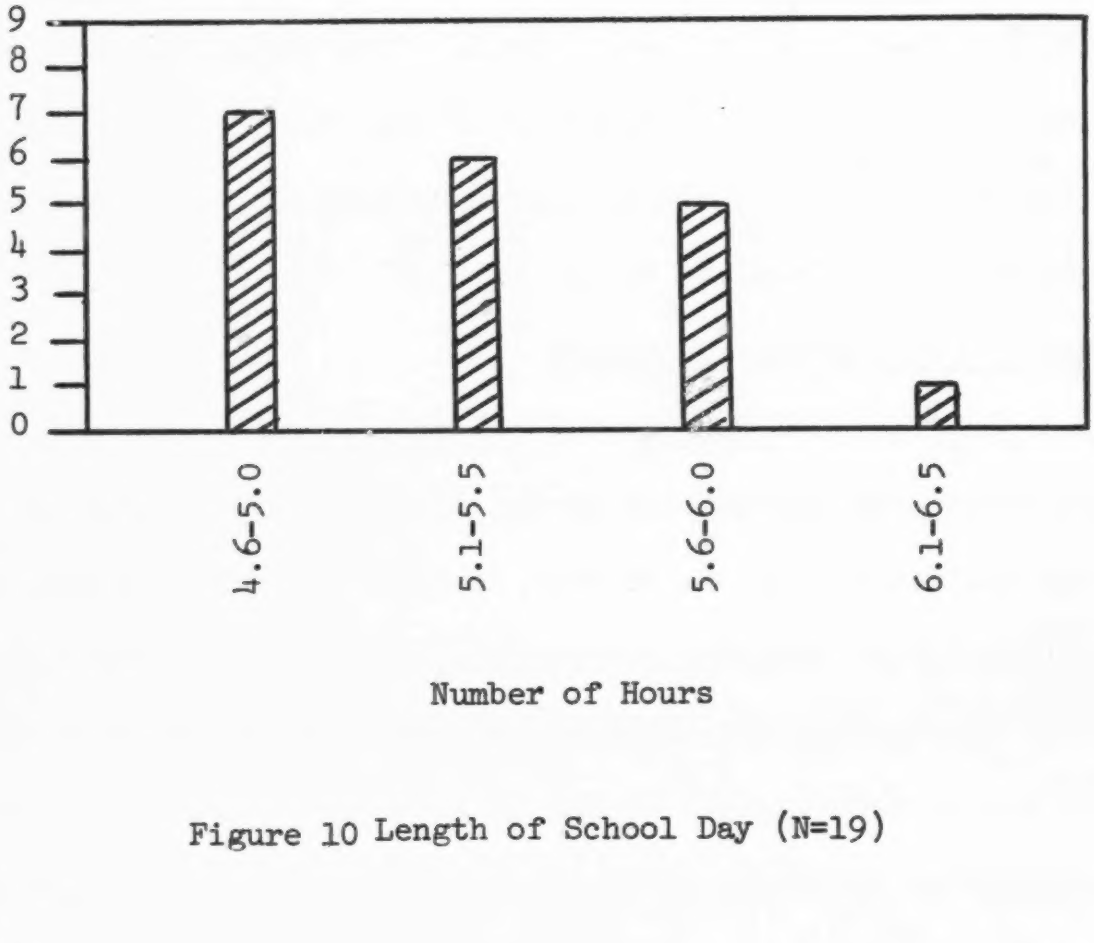

Figure 10 Length of School Day (N=19)

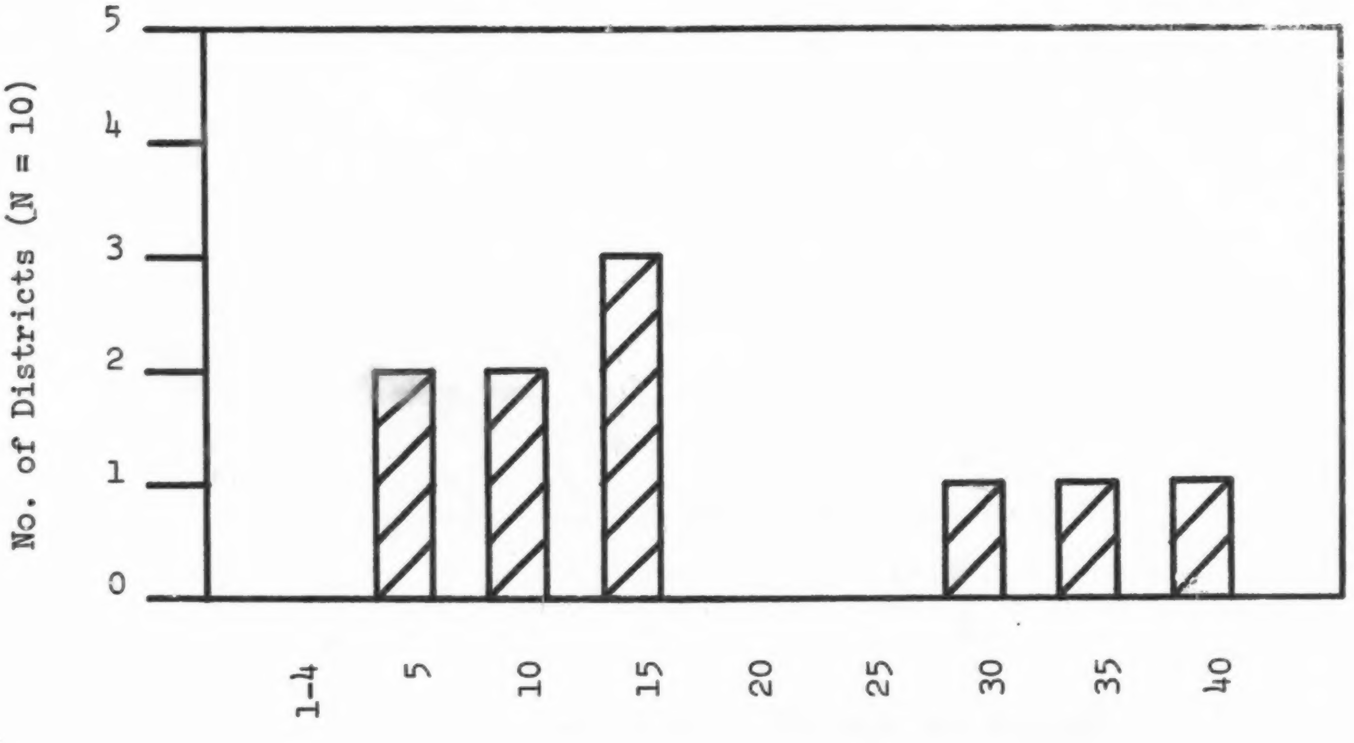

Figure 11 Number of Third-Grade Classrooms in School District

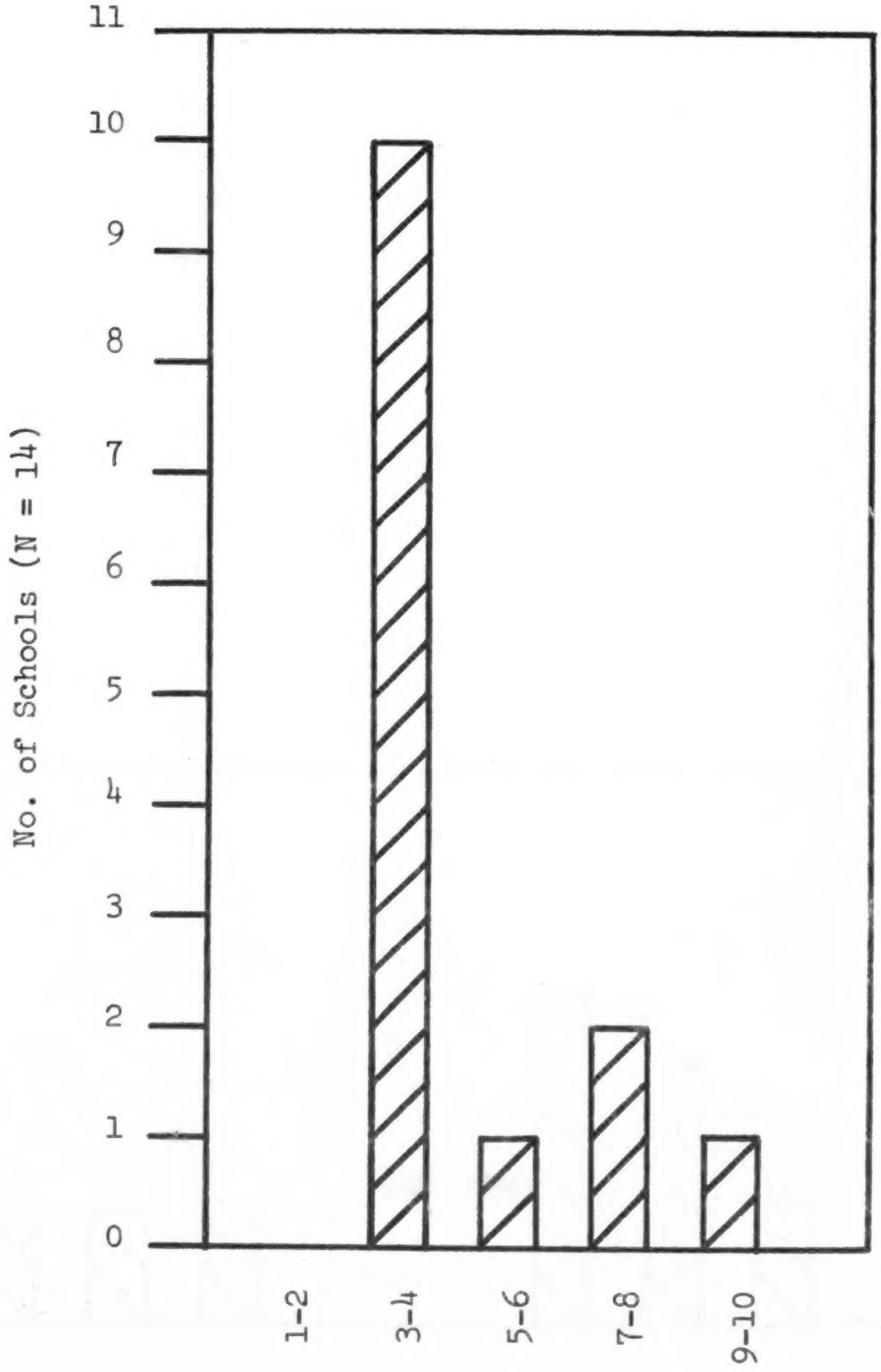

Figure 12 Number of Third-Grade Classrooms in School Building

TABLE 16

DISTRIBUTION OF SUBJECT BY SEX

| | End of 1966 | | | | 1966-67 | | | |
|---|---|---|---|---|---|---|---|---|
| | First Grade | | Second Grade | | Second Grade | | Third Grade | |
| | Boys | Girls | Boys | Girls | Boys | Girls | Boys | Girls |
| i.t.a. | 52.43 | 47.56 | 50.67 | 49.32 | 51.8 | 48.2 | 48 | 52 |
| T.O. | 50.90 | 49.09 | 45.96 | 54.03 | 48.2 | 51.8 | 44.7 | 55.3 |

Description of the Sample: Pupil Information

From Table 16 it can be seen that for the third-grade i.t.a. (as of the end of 1967) and its comparable T.O. group, the balance between boys and girls was approximately equal. For the 1968 third-grade groups there were 150 boys and 147 girls in the i.t.a. group which is also equivalent, while for the T.O. groups, there were 94 boys and 112 girls. This difference was not quite significant. On the basis of previous studies there is some debate as to whether sex is a major variable. In any case, where sex differences were found it was reported that the girls read better than the boys. Of course, there were other studies where no sex differences were reported. Since the percentage of girls for both 1967 and 1968 third-grade samples is greater for the T.O. group this could conceivably bias the results in favor of the T.O. classrooms in third grade if sex were considered to be a major factor. However, the differences observed are not quite significant and hence would not be expected to influence the statistical calculations significantly.

## Intelligence

Table 17 presents the mean intelligence and standard deviation for the I.Q. scores on the Pintner-Durost test of intelligence for the third-grade pupils within the sample. From the following figures, it can be seen that the mean I.Q. for the groups instructed in traditional orthography beginning in either kindergarten or first grade was slightly lower than that of the i.t.a. groups for comparable years. For the ends involved there was not a significant difference between the i.t.a. and T.O. groups who had not had kindergarten instruction on their third-grade intelligence test scores, but there was a significant difference between the two groups who had had kindergarten reading instruction. As a result, adjustments for means were made therefore utilizing an analysis for covariance in statistically treating the data or by an analysis of variance in which the I.Q.s were kept constant by categories. The intelligence test scores obtained on the Pintner Cunningham test, which was administered at the first-grade level, ranged between 102 to 105 between the lowest and highest mean scores for the T.O. and i.t.a. groups. As can be seen, the measurements obtained in the Pintner-Durost were significantly higher than those obtained on the Pintner Cunningham. Nevertheless, controls were exercised by putting both the i.t.a. and T.O. groups in one frequency distribution by intelligence and dividing this frequency distribution into three categories. As a result the ends within each intelligence category will vary for the i.t.a. and T.O. groups. On examining the mean I.Q.s for each of the categories for each of the groups, low, middle and high, it was observed that the I.Q.s were almost exactly the same. A test of significance proved that there was no significance among the lows, middles, or high categories in intelligence between the i.t.a. and T.O. groups in any of the comparisons. To be certain that these controls were accurate an analysis of covariance was also computed using I.Q. as one of the covariates.

TABLE 17

MEAN PINTNER-DUROST I.Q. SCORES FOR THIRD GRADE i.t.a. AND T.O. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION

|  | I.Q. | M | SD |
|---|---|---|---|
| i.t.a. 1968 (w/k)* |  | 113.0 | 10.3 |
| T.O. 1968 (w/k) |  | 110.0 | 11.4 |
| i.t.a. 1967 (wo/k)* |  | 113.6 | 11.1 |
| T.O. 1967 (wo/k) |  | 111.9 | 12.5 |

*Significant at the .05 level of confidence

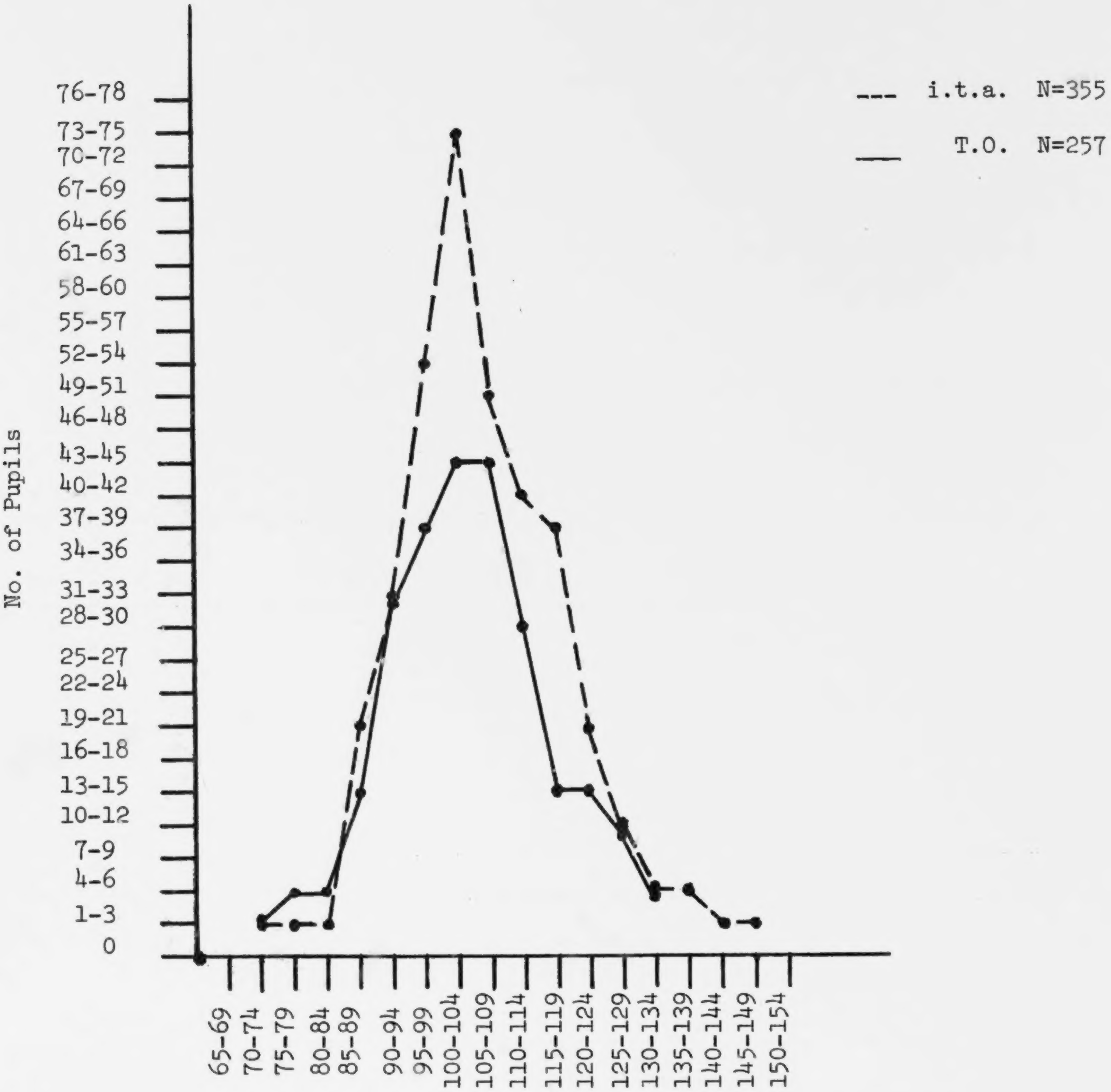

Figure 13. Pintner-Cunningham I.Q. Scores of September 1964 for Second-Grade i.t.a. and T.O. Pupils in the 1967 Population.

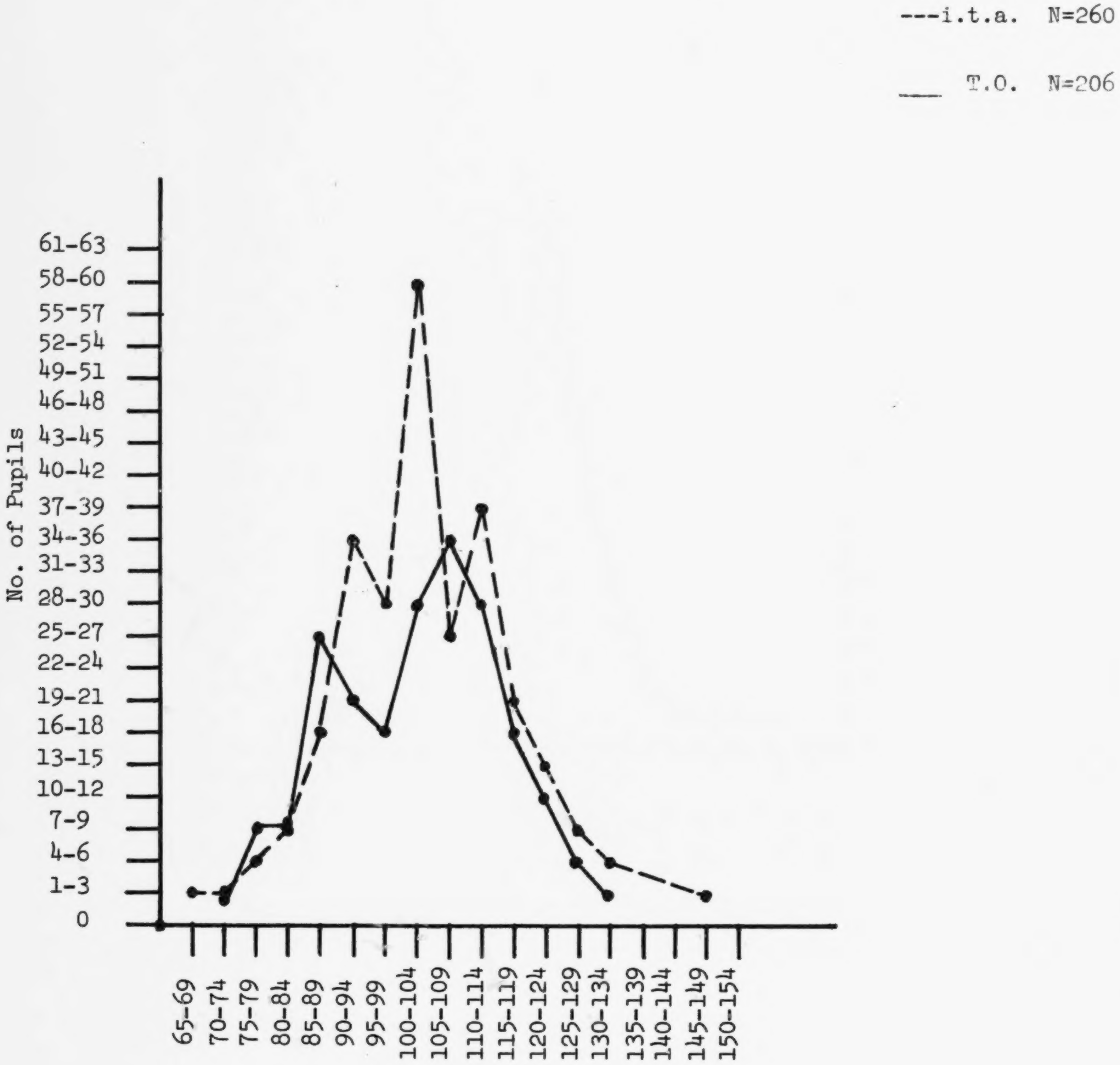

Figure 14 Pintner-Cunningham I.Q. Scores of September 1964 For Third-Grade i.t.a. and T.O. Pupils in the 1967 Population.

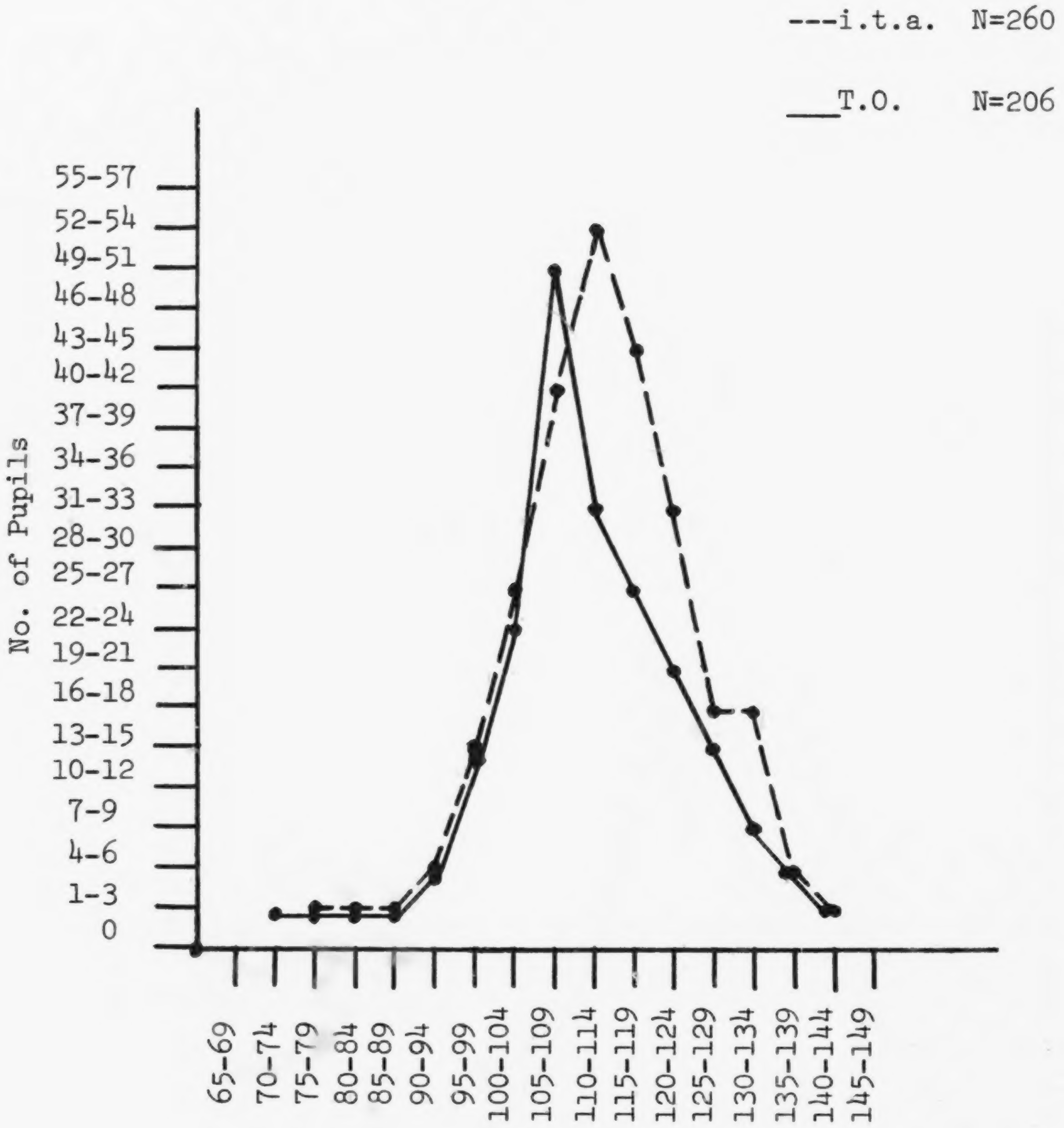

Figure 15 Pintner-Durost I.Q. Scores for Third-Grade i.t.a. and T.O. Pupils, May 1967.

## Socioeconomic Status

Table 18 provides the percentage of the children who fell within each of the eight categories of parental occupation for the total sample. The figures given are for the first two years of the study as the figures for the previous two years did not change materially.

TABLE 18

PERCENTAGE DISTRIBUTION BY CATEGORY FROM SIMS OCCUPATIONAL SCALE

| | First Grade, 1964-65 | | First Grade, 1965-66 | | Second Grade, 1965-66 | |
|---|---|---|---|---|---|---|
| Categories | i.t.a. | T.O. | i.t.a. | T.O. | i.t.a. | T.O. |
| 1 | 23.2 | 21.1 | 23.2 | 18.2 | 22.9 | 27.0 |
| 2 | 13.2 | 13.9 | 12.7 | 15.5 | 15.8 | 20.2 |
| 3 | 14.3 | 13.2 | 13.0 | 10.6 | 16.5 | 14.9 |
| 4 | 4.2 | 4.0 | 3.2 | 3.7 | 4.4 | 3.2 |
| 5 | 30.1 | 31.1 | 33.0 | 37.4 | 29.3 | 25.0 |
| 6 | 5.8 | 4.5 | 7.3 | 4.3 | 5.0 | 5.3 |
| 7 | 8.5 | 6.7 | 6.1 | 9.4 | 6.1 | 4.0 |
| 8 | .7 | .5 | 1.5 | .9 | 00 | .4 |

Legend:
1. Professional
2. Owner-Manager
3. Salesman
4. Foreman
5. Technical (Skilled and Semi-Skilled)
6. Clerical
7. Unskilled
8. Unemployed

The following table presents the figures for the total groups by categories of parental occupation for the final year of the study. As can be observed in the table, almost 23% of the children in the sample had parents who were employed as professionals. Fifteen percent had parents who were owner-managers. Twelve percent had parents employed as salesmen. Three percent had parents employed as foremen. Thirty-five percent had parents employed in technical (skilled and semi-skilled) occupations. Seven percent had parents employed in clerical occupations. Six percent had parents who are unskilled, and only .4% had parents who were unemployed. These figures vary from those of the normal population, as there is a much higher percentage of children in the first two categories as compared to what would normally be found. Thus the children in this study would generally fall in higher categories socioeconomically than would usually be the case. Since the Long Island area is not typical of the national population in terms of socioeconomic categories, interpreting these results and generalizing them for populations different than that obtained for this study would be risky. Looking at the socioeconomic levels by district, it may be observed that there are considerable differences among districts. Districts 5 and 6 have almost half of the children in the population's parents employed in professional areas. For categories 1 and 2 in these two districts, well over half the children have parents falling into those two categories. District 8, on the other hand, has only 13% of the children's parents in professional occupations, and the total percentage for categories 1 and 2 is a little less than one quarter of the total sample from that district. Hence, there are considerable differences among the districts in overall socioeconomic level. Because the size of the sample would have been small if done by individual district, the percentages given for the total districts are the most meaningful. Since all districts had an almost 50-50 breakdown between i.t.a.- and T.O.-instructed children, the differences in socioeconomic levels of the children within each district should not have a major effect upon the results obtained. As can be seen, district 4 is eliminated from this description of socioeconomic levels since that district had no children who were instructed at the kindergarten level. Hence, there were no third-grade classes from this district in the study. District 4, however, was fairly close to the average of the other districts in terms of the socioeconomic categories as can be seen on the table listing the socioeconomic distribution within each district percentage distribution from Sims occupational scale for each district. The table presenting the percentage distribution by category for each district is presented in Appendix O.

## TABLE 19

### SOCIOECONOMIC DISTRIBUTION WITHIN EACH DISTRICT PERCENTAGE DISTRIBUTION BY CATEGORY FROM SIMS OCCUPATIONAL SCALE FOR EACH DISTRICT

| District | Category | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1. | 19.5 | 14.3 | 14.8 | 2.6 | 38.7 | 7.4 | 2.7 | |
| 2. | 18.2 | 18.2 | 22.7 | 4.5 | 22.7 | 13.7 | | |
| 3. | 11.7 | 8.3 | 8.3 | 5.0 | 46.7 | 3.3 | 15.0 | 1.7 |
| 4. | 45.5 | 9.1 | 1.8 | 3.6 | 29.1 | | 10.9 | |
| 5. | 42.6 | 19.1 | 10.6 | 4.3 | 14.9 | 4.3 | 2.1 | 2.1 |
| 6. | 20.0 | 15.0 | 10.0 | | 40.0 | 15.0 | | |
| 7. | 13.0 | 8.7 | 19.6 | 2.2 | 36.9 | 10.9 | 8.7 | |
| 8. | 20.0 | 11.4 | 11.4 | | 42.9 | 2.9 | 11.4 | |
| 9. | 28.6 | 38.1 | 4.8 | | 18.9 | 4.8 | 4.8 | |
| 10. | 12.9 | 25.8 | 9.7 | | 35.5 | 12.9 | 3.2 | |
| | 22.7 | 14.6 | 11.9 | 2.7 | 35.2 | 6.6 | 5.9 | |

Legend:
1. Professional
2. Owner-Manager
3. Salesman
4. Foreman
5. Technical (Skilled and Semi-Skilled)
6. Clerical
7. Unskilled
8. Unemployed

## End-of-Year Results: First-Year Analysis of Variance

Only one of the hypotheses of this study was amenable to statistical treatment at the end of the first year. The hypothesis treated stated that introducing a consistent medium such as i.t.a. to first-grade children in a formal reading program would result in significantly better reading and spelling achievement than that attained by children who learned in traditional orthography in first grade, when both groups of children are measured at the end of first grade. To test this hypothesis, a 3 x 2 analysis of variance was computed for the two media and high, middle, and low intelligence for each of the subtests of the Stanford Achievement Test, Primary I. A description of each of the Stanford subtests and the results of the analyses at the end of the first year of this study follow:

Word Reading. This subtest consists of 35 items, graduated in difficulty, which measure the ability of a pupil to analyze a word without the aid of context. The test employs a multiple-choice type of item in which the pupils are required to look at a picture and then select the word which stands for the picture from a group of four words. For example, a pupil may see a picture of the sun and see the words--"not, him, sun, sit." He must read the words and mark the one which means "sun." In doing this, he responds to more than a single sound element.

Tables 20, 22, 24 and 26 report the means by I.Q. category for each of the Stanford subtests for the i.t.a. group without kindergarten reading experience and for the T.O. group without kindergarten reading experience. Tables 21, 23, 25 and 27 present the analyses of variance for Word Reading, Paragraph Meaning, Word Study Skills and Spelling. As can be observed in the table of means, the average scores in Word Reading of the i.t.a.-taught kindergarten children are slightly higher than the mean scores of the T.O.-taught kindergarten group for each of the three I.Q. categories. The computed analysis of variance, as can be seen in Table 21, yields an F ratio of 1.64 which for 1 and 32 degrees of freedom is not significant at the .05 level of confidence. This suggests that differences which occurred between the media are due to chance factors and that there was greater variation among the teachers or classes within an experimental group than differences between the groups. As can be seen in Table 21 the main effect of intelligence is significant as indicated by the obtained F ratio of 37.92, which is significant at well beyond the .01 level of confidence. This demonstrates that there are significant differences in the I.Q.'s of the three groups. The interaction between intelligence and medium of instruction was not significant as can be seen by the obtained F ratio which was less than 1. From Figure 16 it can be seen that there is a strong linear relationship between medium and I.Q. subclass, and that the lines are relatively parallel between the two media with the means of the i.t.a. group higher for each of the intelligence categories.

Paragraph Meaning. This subtest consists of a series of paragraphs, graduated in difficulty, from each of which one or more words have been omitted. The pupil's task is to demonstrate his comprehension of the paragraph by selecting the proper word for each omission from four choices that are afforded him. The test thus provides a functional measure of the child's ability to comprehend connected discourse ranging in length from single sentences to paragraphs of six sentences and involving levels of comprehension varying from extremely simple recognition to the making of inferences from several related sentences. The authors have attempted in this test to emphasize the notion of "reading as reasoning" and, accordingly, have constructed exercises that place a premium on genuine comprehension of the material read.

On the Paragraph Meaning subtest the means reported in Table 22 were 15.49, 17.13; 20.88, 21.87; and 27.78, 26.28 for the i.t.a. and T.O. groups, respectively, for each of the three I.Q. categories. The F computed between the two treatments was less than 1 (.11) which is not significant at the .05 level of confidence for 1 and 32 degrees of freedom. Hence, the slight mean differences between the two groups could have easily resulted from chance. As shown in Table 23 the highly significant F ratio of 28.97 for intelligence indicates that there are significant differences among the categories of intelligence. The interactional effects of the media and I.Q. subclass can be seen in Figure 17. The lower-I.Q. T.O. children had a higher mean score than the i.t.a. children. The same advantage for the T.O. children held, but at an even lower level, in the average-I.Q. category. But for the high-I.Q. children, the i.t.a. group had a slightly higher mean score. The F ratio of .69, computed for intelligence by method, reveals that no significant interaction exists between intelligence and treatment.

Word Study Skills. This subtest includes 56 multiple-choice items, as follows:

Auditory perception of beginning sounds--14 items. In this part a pupil hears one word read by the teacher. Then he reads with the teacher three other words from which he must select one whose beginning sound is the same as the word the teacher first read.

Auditory perception of ending sounds--14 items. In the second part, the word to be chosen has the same ending sound as a word which the pupil hears.

Phonics--selecting the written word which is the same as the last word in a sentence read by the teacher--14 items. In this part a pupil must match a word he hears with one of three which he reads.

Phonograms--rhyming words--14 items. A pupil must match a word which he hears with a word which he reads.

As can be seen in the table of means, the average scores of the i.t.a. group are higher for each of the three I.Q. categories than the T.O. mean scores. For the low-I.Q. category, the means are 34.46 and 34.02, for the average-I.Q. category, 39.48 and 39.16, and for the high-I.Q. category, 44.82 and 43.83, for the i.t.a. and T.O. groups respectively. The F computed between the media was less than 1 (F=.25), which would not be significant, and suggests that any differences obtained are likely due to chance factors. As shown in Table 27, the three I.Q. categories are significantly different as indicated by the statistically significant F ratio of 25.14. For the interactional effects, the F computed was .03, which suggests no significant interaction. Figure 18 illustrates this, and again suggests linearity between method and I.Q. subclass for each of the two media with lines that virtually coincide.

Spelling. Spelling ability is measured in the Primary I Battery by means of a twenty-item test.

In this subtest the Spelling test employs a dictation-type exercise--one in which the word to be spelled is pronounced by the teacher, an illustrative sentence is read, and the word is repeated, whereupon the pupil writes the word in his test booklet. It attempts to insure that the child knows what word is to be spelled, and calls upon him to spell the word as he would normally do in his own writing.

An examination of the table of means reveals that the T.O. group was superior to the i.t.a.-taught group for each category of intelligence. The F computed for the medium by class within medium is 20.63, which is significant at beyond the .01 level of confidence. This result indicates that the spelling ability of the i.t.a.-taught children was significantly poorer at the end of first grade than that of the T.O.-taught children. Again, the difference in intelligence among the three I.Q. categories was very significant (F=13.29). The F computed for the interactional effects is less than 1, which is not significant. The effect of medium by I.Q. subclass can be seen in Figure 19. Although the lines are parallel between the two media, it can be seen that the T.O. medium is significantly higher for each of the I.Q. categories.

At the end of the first year of the study, the results of the analysis of variance for each of the reading subtests of the Stanford Primary suggest no significant difference in achievement between the i.t.a. and T.O. groups that began reading instruction in first grade. Hence, greater variation was observed among the teachers of a medium than was observed between the two groups. The teacher would, therefore, be considered a greater variable than the medium of instruction in reading achievement. The only significant F was in the area of spelling in which we find a significant difference beyond the .01 level for those children who were being instructed in traditional orthography. Since the spelling test was scored by normal T.O. standards, it is not surprising that this result occurred. It should be noted, however, that only one-half of the children who were being instructed in the i.t.a. medium had made transition to traditional orthography at the time of the final tests. All final tests were administered in traditional orthography and, therefore, there were approximately one-half of the i.t.a. children who had seen virtually no traditional orthography in the instructional program of their classroom during the 140 days of the experimental period. The fact that no significant differences in reading were observed between T.O. and i.t.a. children at the end of first grade, despite the fact that many i.t.a. children had not been instructed in T.O. and had not yet made a transition, suggests that differences may show up later, after all children in the study who were instructed in i.t.a. make the transition to traditional orthography.

## End-of-Year Results: Second-Year Analysis of Variance

At the end of the second year of this longitudinal study it was possible to evaluate not only the relative effectiveness of orthography (i.t.a. or T.O.) upon reading and spelling achievement, but also the effect of introducing reading instruction at the kindergarten level. The results of the analyses are presented below.

The first hypothesis predicted that introducing a consistent medium such as i.t.a. to kindergarten children in a formal reading

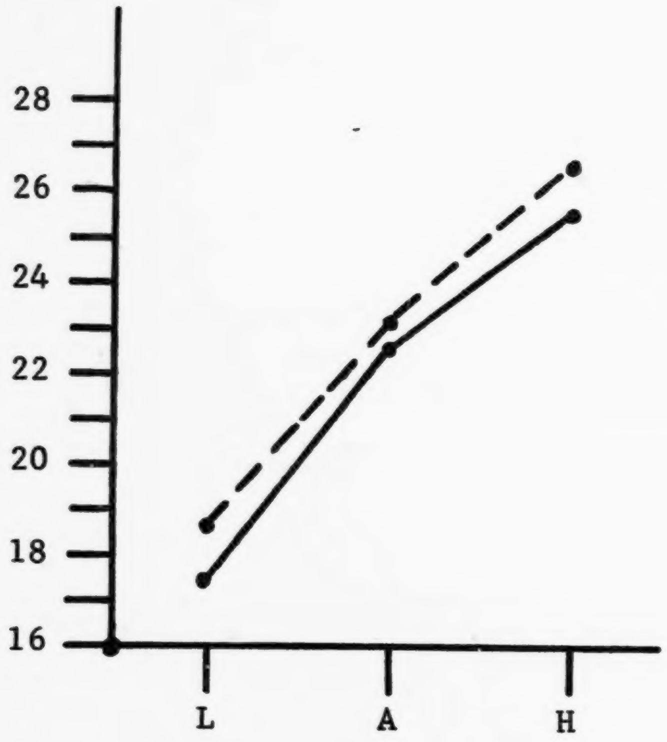

Figure 16

Relationship between Treatment and I.Q. on the Word Reading Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. and T.O. Groups without Kindergarten Reading Instruction, at the End of First Grade, 1965

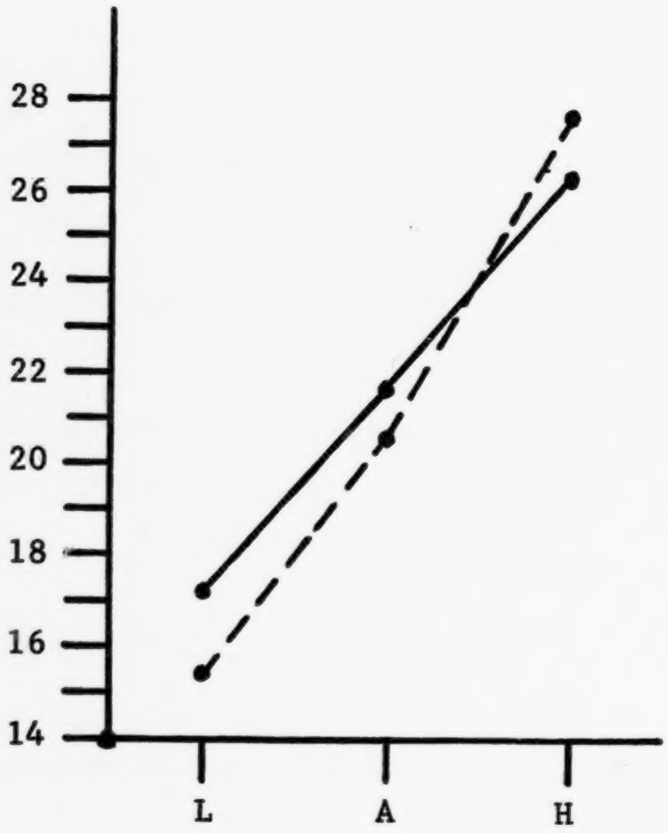

Figure 17

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. and T.O. Groups without Kindergarten Reading Instruction, at the End of First Grade, 1965

## TABLE 20

## TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD READING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group | Variables | i.t.a.<br>N=17 | T.O.<br>N=17 |
|---|---|---|---|
| | Low | 18.89 | 17.57 |
| I.Q. | Average | 23.04 | 22.85 |
| | High | 26.77 | 25.42 |

## TABLE 21

## ANALYSIS OF VARIANCE FOR THE WORD READING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION, AT THE END OF FIRST GRADE, 1965

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 532.33 | 37.92** |
| Method | 1 | 22.97 | 1.64 |
| I.Q. x M | 2 | 3.75 | .27 |
| Error (within) | 32 | 14.04 | |

**Significant at the .01 level of confidence

## TABLE 22

## TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | i.t.a.<br>N=17 | T.O.<br>N=17 |
|---|---|---|---|
| | Low | 15.49 | 17.13 |
| I.Q. | Average | 20.88 | 21.87 |
| | High | 27.78 | 26.28 |

## TABLE 23

## ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION AT THE END OF FIRST GRADE, 1965

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 977.88 | 28.97** |
| Method | 1 | 3.65 | .11 |
| I.Q. x M | 2 | 23.26 | .69 |
| Error (within) | 32 | 33.76 | |

**Significant at the .01 level of confidence

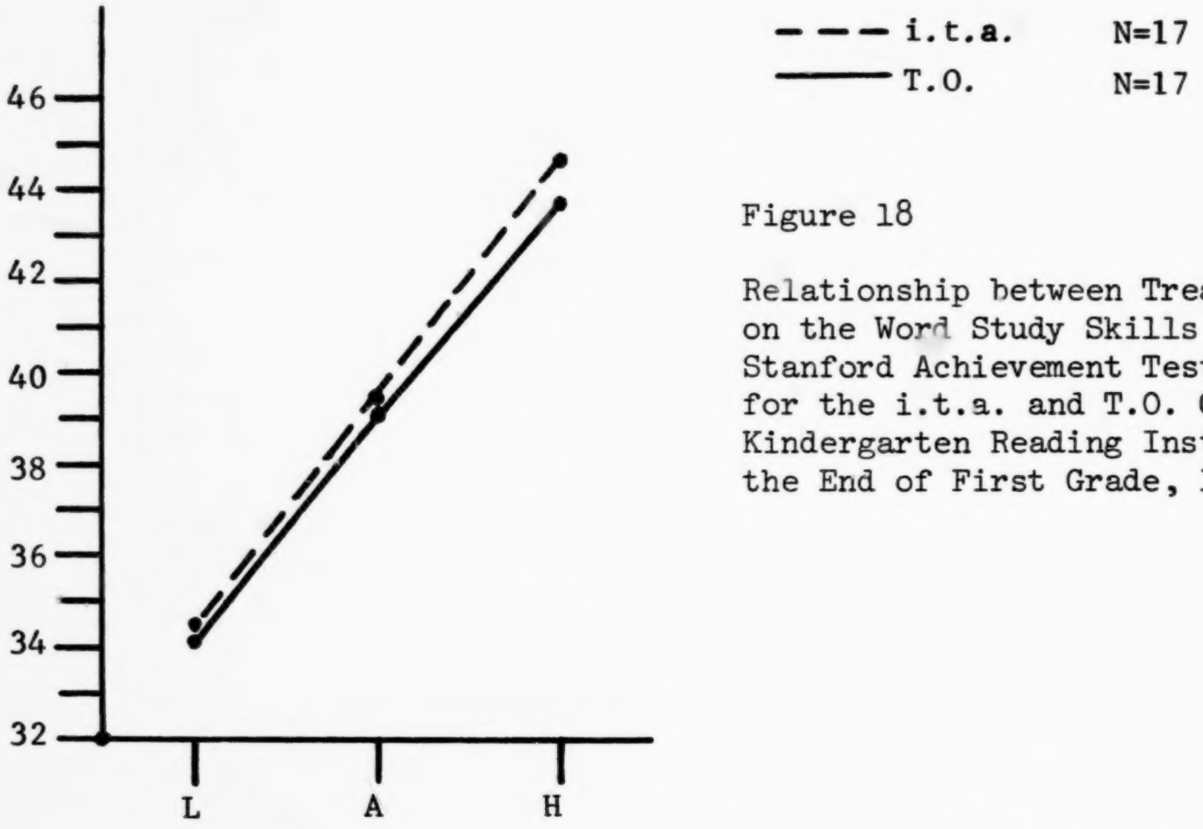

Figure 18

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. and T.O. Groups without Kindergarten Reading Instruction, at the End of First Grade, 1965

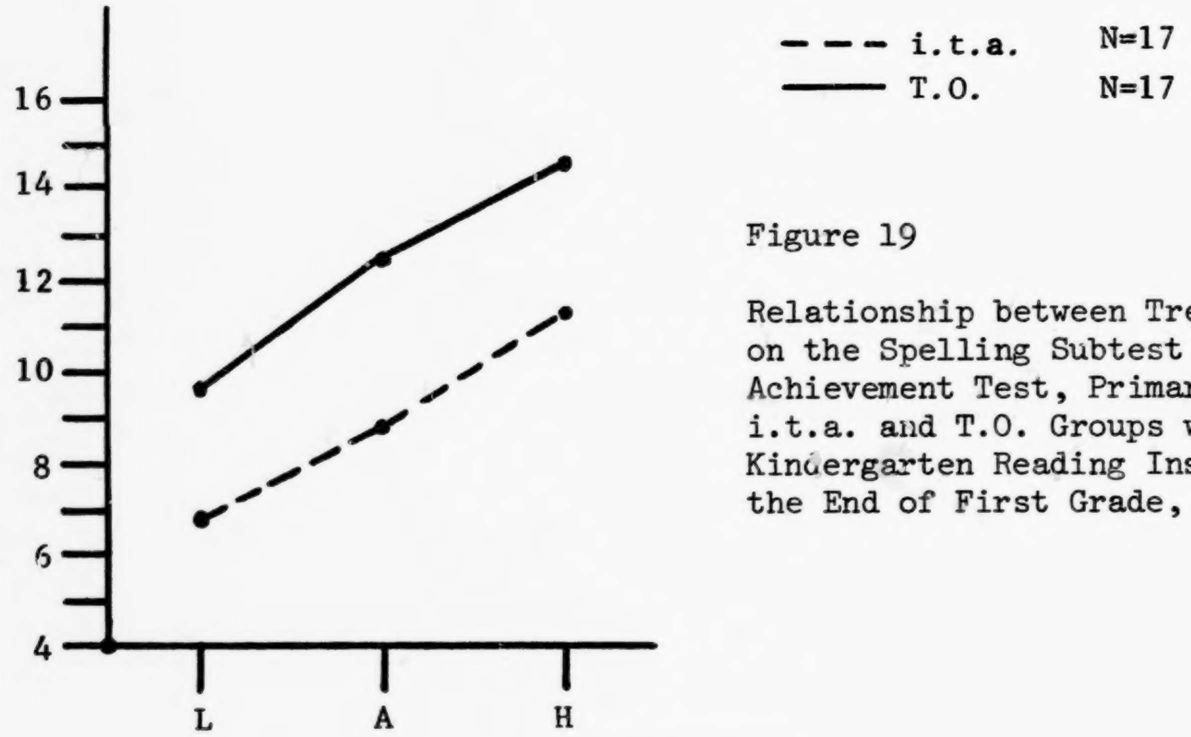

Figure 19

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. and T.O. Groups without Kindergarten Reading Instruction, at the End of First Grade, 1965

## TABLE 24

### TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | i.t.a. N=17 | T.O. N=17 |
|---|---|---|---|
| | Low | 6.99 | 9.82 |
| I.Q. | Average | 8.99 | 12.55 |
| | High | 11.24 | 14.69 |

## TABLE 25

### ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION AT THE END OF FIRST GRADE, 1965

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 176.96 | 13.29** |
| Method | 1 | 274.73 | 20.63** |
| I.Q. x M | 2 | 1.33 | .10 |
| Error (within) | 32 | 13.32 | |

**Significant at the .01 level of confidence

## TABLE 26

### TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | i.t.a. N=17 | T.O. N=17 |
|---|---|---|---|
| | Low | 34.46 | 34.02 |
| I.Q. | Average | 39.48 | 39.16 |
| | High | 44.82 | 43.83 |

## TABLE 27

### ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION AT THE END OF FIRST GRADE, 1965

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 865.08 | 25.14** |
| Method | 1 | 8.71 | .25 |
| I.Q. x M | 2 | 1.10 | .03 |
| Error (within) | 32 | 34.41 | |

**Significant at the .01 level of confidence

program would result in significantly better reading and spelling achievement than that attained by children who learned in traditional orthography in kindergarten, when both groups are measured at the end of first grade.

On the Word Reading subtest of the Stanford Achievement Test, Primary I, Table 28 illustrates the means by I.Q. category for the i.t.a. and T.O. groups. As can be seen in Table 28 the i.t.a. mean was 21.38 for the bottom third I.Q. group, and the T.O. mean was 19.27. For the group with average intelligence the i.t.a. group had a mean of 25.36 and the T.O. group, 22.12. The high-I.Q. group had means computed at 28.02 and 23.58 for the i.t.a. and T.O. groups, respectively. As shown by the graph in Figure 20 the means of the i.t.a. group were higher than the means of the T.O. group for all categories of intelligence. In addition, a strong *linear relationship* is exhibited between intelligence and reading achievement for each group. The lines of the two groups are relatively parallel, which reflects no interaction between the two. This is confirmed by the F ratio of .81 which indicates that no significant interaction exists between intelligence and treatment. As can be seen in Table 29 the F ratio computed for the difference between the mean Word Reading achievement of the i.t.a. and T.O. groups was 18.55 for 1 and 121 degrees of freedom. This difference would be significant at the .01 level of confidence and beyond. Hence, on the Word Reading subtest, the i.t.a. group was significantly higher in achievement than the group instructed in traditional orthography. The difference between the achievement of the two treatment groups was considerably greater than the variability found between classes. Hence, the medium of instruction produced greater differences in results than the differences found among the teachers. As revealed in Table 29, the F ratio computed for differences in the I.Q.'s of the three intelligence categories was 18.45, which is significant at the .01 level of confidence and beyond.

Table 30 illustrates the means by I.Q. category for the Paragraph Meaning subtest. The means for the i.t.a. group were higher than the means of the T.O. group for each of the three I.Q. categories. For the low-I.Q. category the means were 18.69 and 17.31. For the average-I.Q. category the means were 23.13 and 20.17; and for the high-I.Q. category, 27.52 and 25.17, for the i.t.a. and T.O. groups respectively. As can be seen by the visual representation of these results in Figure 21, a strong linear relationship again is suggested between intelligence and reading achievement for each of the two treatment groups. The greatest observed difference is in the average-I.Q. group, where the mean of the i.t.a. group appears to be considerably higher than the mean for the T.O. group. Nevertheless, the two lines are relatively parallel, which suggests no interaction between intelligence and method. This lack of interaction between treatment and intelligence is confirmed by the F ratio of .21 which is not significant. The divergence between the lines, when tested for significance, yielded an F ratio of 4.94, as indicated in Table 31, which was barely significant at the .05 level of confidence. It would appear from the table of means that this difference resulted primarily in the observed difference among the average-I.Q. children. Among the low-I.Q. children, the difference in achievement was very small, and among the high-I.Q. children, the difference was still small, although relatively greater than that found among the low-I.Q. group. This would suggest that Paragraph Meaning or comprehension of children instructed in i.t.a. was significantly higher than that of those children instructed in T.O., in the average intelligence category. The i.t.a. group, however, was higher than the T.O. group in all three intelligence categories. Since class means were used as the unit of observation, it would suggest that the medium is producing the effect rather than the differences among the teachers. Again the highly significant F ratio for intelligence, as revealed in Table 31, suggests that the three I.Q. categories are significantly different.

On the Word Study Skills subtest, the means illustrated in Table 32 reveal that those children instructed in i.t.a. had higher means in each of the three I.Q. categories than those children instructed in traditional orthography. The means are 36.50, 33.51, 41.37, 39.28; and 44.38, 41.22 for the i.t.a. and T.O. groups, respectively, for each of the three I.Q. categories. As can be seen in Figure 22, the i.t.a. group exceeded the T.O. group for each of the three I.Q. categories. A strong linear relationship exists between intelligence and reading achievement for both treatment groups. Since the regression lines are relatively parallel, no interaction is observed between intelligence and medium. The F ratio of .09 computed for intelligence by treatment reveals that no significant interaction exists. To determine whether divergence between the two lines was significant, an analysis of variance was computed yielding an F of 6.26 for 1 and 121 degrees of freedom, as illustrated in Table 33. This would be significant at beyond the .05 level of confidence, but not significant at the .01 level of confidence. This result suggests that in word analysis the i.t.a. children exhibited significantly higher achievement than those children instructed in traditional orthography. It is also interesting to note that the mean Word Study Skills score of the high-I.Q. T.O. group was slightly lower than the mean of the average-I.Q. i.t.a. group. Again, for this subtest, differences in the medium of instruction were significantly greater than the differences among the teachers. Again, the differences in the three I.Q. categories were very significant as may be observed by the F ratio of 17.93, which is significant at well beyond the .01 level.

The Spelling subtest of the Stanford Achievement Test, Primary I, yielded results similar to those found in the results observed during the first year of the study. As can be observed in Table 34 the average spelling achievement by I.Q. category is higher in the T.O. group consistently. For the low-I.Q. category the means are 7.92 and 9.70, for the average-I.Q. category, 9.93 and 12.26, and for the high-I.Q. category, 11.67 and 14.12, for the i.t.a. and T.O. groups respectively. As can be seen in Figure 23, there is a strong linear relationship between spelling achievement and intelligence. Since the lines are relatively parallel, no interaction between intelligence and method is observed. This is confirmed statistically in the analysis of variance as the computed F ratio of .12 is not significant. The discrepancy between the two lines with the T.O. group having the higher mean for each of the three I.Q. categories was tested for significance. The results are revealed in Table 35. The resulting F ratio of 14.01 suggests that the traditional orthography group was significantly better in spelling at the .01 level of confidence. The degree of difference seems to be relatively the same for each I.Q. category. This is further verification of the results obtained last year when the T.O. group at the end of the first year was spelling at a significantly higher level. Since the differences between the media were considerably greater than the differences among the teachers, it would appear that it is the i.t.a. medium which produces the poorer results in spelling rather than teaching discrepancies resulting from differences in teacher effectiveness. As can be observed in Table 35, significant differences in the three categories of intelligence are revealed by the F ratio of 15.86 which is significant at well beyond the .01 level of confidence.

In summary, when reading instruction begins at the kindergarten level, children instructed in i.t.a. are significantly superior to those instructed in T.O. in Word Reading, Paragraph Meaning and Word Study Skills. It would appear, therefore, that i.t.a. produces better word recognition, word analysis and comprehension than does T.O. instruction, at the end of first grade. In the area of Spelling achievement, children instructed in traditional orthography spell significantly better than those children who are instructed in i.t.a.

The second hypothesis predicted that introducing a consistent medium such as i.t.a. to kindergarten children will result in significantly better reading and spelling achievement than that attained by children who begin formal reading instruction in first grade in i.t.a. when both groups are measured at the end of first grade. An examina-

## TABLE 28

## TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION ON THE WORD READING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | i.t.a.<br>N=409 | T.O.<br>N=332 |
|---|---|---|---|
| | Low | 21.38 | 19.27 |
| I.Q. | Average | 25.36 | 22.12 |
| | High | 28.02 | 23.54 |

## TABLE 29

## ANALYSIS OF VARIANCE FOR THE WORD READING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION AT THE END OF FIRST GRADE, 1966

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 334.76 | 18.45** |
| Method | 1 | 336.47 | 18.55** |
| I.Q. x M | 2 | 14.74 | .81 |
| Error (within) | 121 | 18.14 | |

**Significant at the .01 level of confidence

## TABLE 30

## TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | i.t.a.<br>N=409 | T.O.<br>N=332 |
|---|---|---|---|
| | Low | 18.69 | 17.31 |
| I.Q. | Average | 23.13 | 20.17 |
| | High | 27.52 | 25.17 |

## TABLE 31

## ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION AT THE END OF FIRST GRADE, 1966

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 746.45 | 23.43** |
| Method | 1 | 157.49 | 4.94* |
| I.Q. x M | 2 | 6.85 | .21 |
| Error (within) | 121 | 31.86 | |

* Significant at the .05 level of confidence
** Significant at the .01 level of confidence

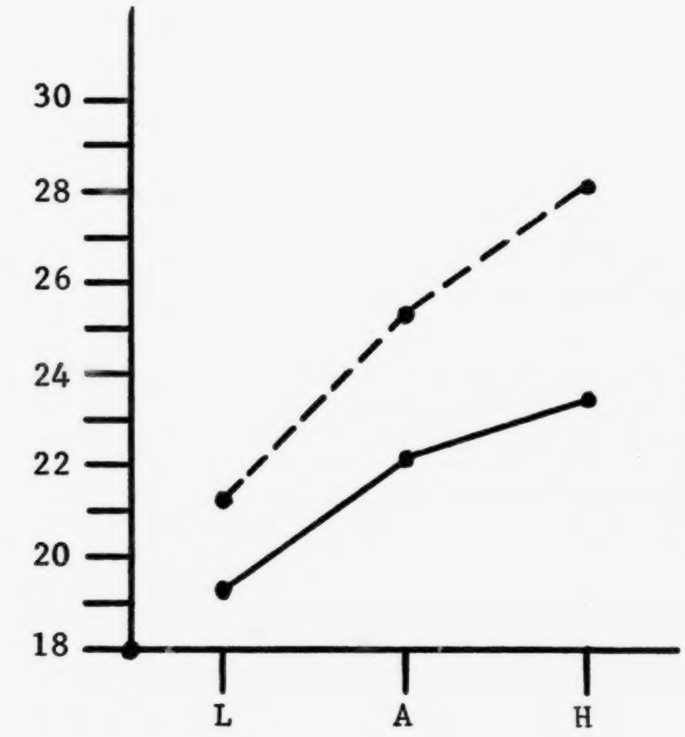

Figure 20

Relationship between Treatment and I.Q. on the Word Reading Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. and T.O. Groups with Kindergarten Reading Instruction at the End of First Grade

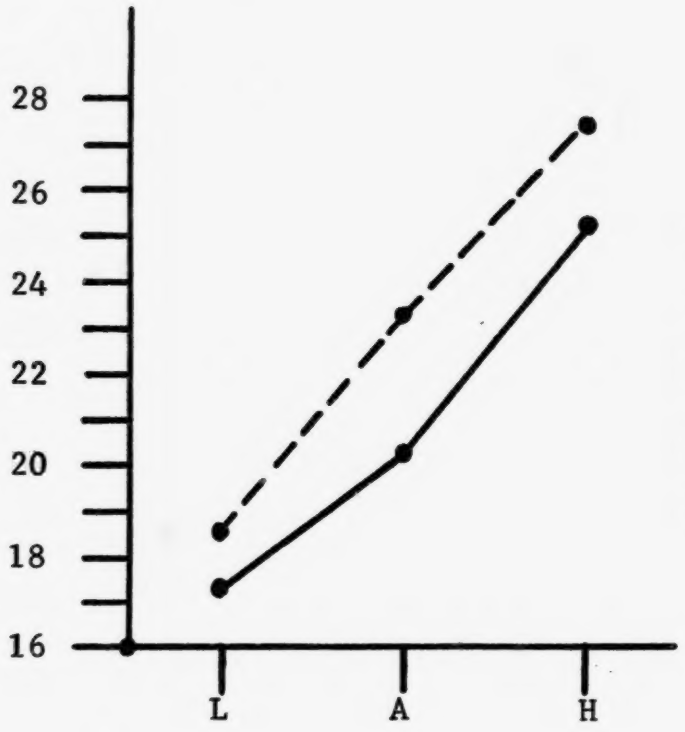

Figure 21

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. and T.O. Groups with Kindergarten Reading Instruction at the End of First Grade

## TABLE 32

### TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | i.t.a. N=409 | T.O. N=332 |
|---|---|---|---|
| | Low | 36.50 | 33.51 |
| I.Q. | Average | 41.37 | 39.28 |
| | High | 44.38 | 41.22 |

## TABLE 33

### ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION AT THE END OF FIRST GRADE, 1966

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 681.13 | 17.93** |
| Method | 1 | 237.81 | 6.26* |
| I.Q. x M | 2 | 3.45 | .09 |
| Error (within) | 121 | 37.99 | |

* Significant at the .05 level of confidence
** Significant at the .01 level of confidence

## TABLE 34

## TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | i.t.a.<br>N=409 | T.O.<br>N=332 |
|---|---|---|---|
| | Low | 7.92 | 9.70 |
| I.Q. | Average | 9.93 | 12.26 |
| | High | 11.67 | 14.12 |

## TABLE 35

## ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION AT THE END OF FIRST GRADE, 1966

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 170.40 | 15.86** |
| Method | 1 | 150.52 | 14.01** |
| I.Q. x M | 2 | 1.32 | .12 |
| Error (within) | 121 | 10.75 | |

** Significant at the .01 level of confidence

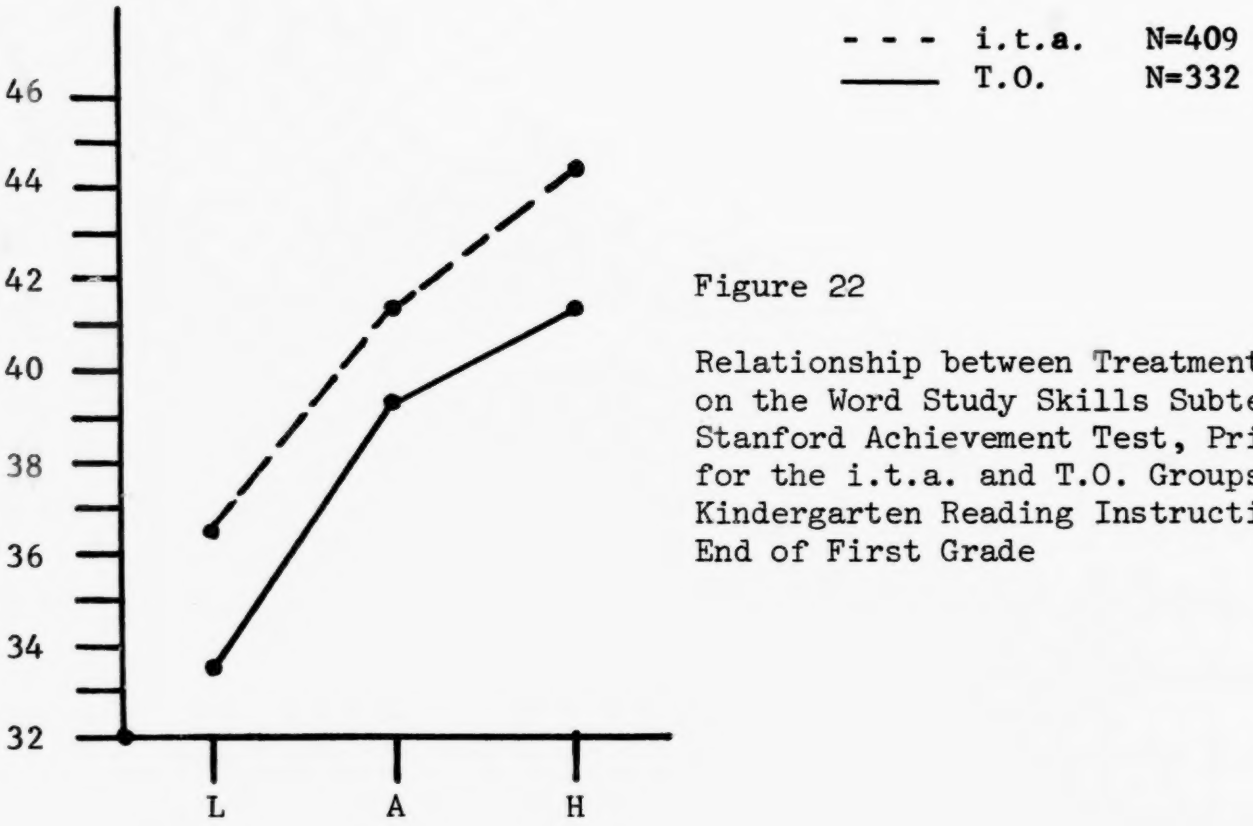

Figure 22

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. and T.O. Groups with Kindergarten Reading Instruction at the End of First Grade

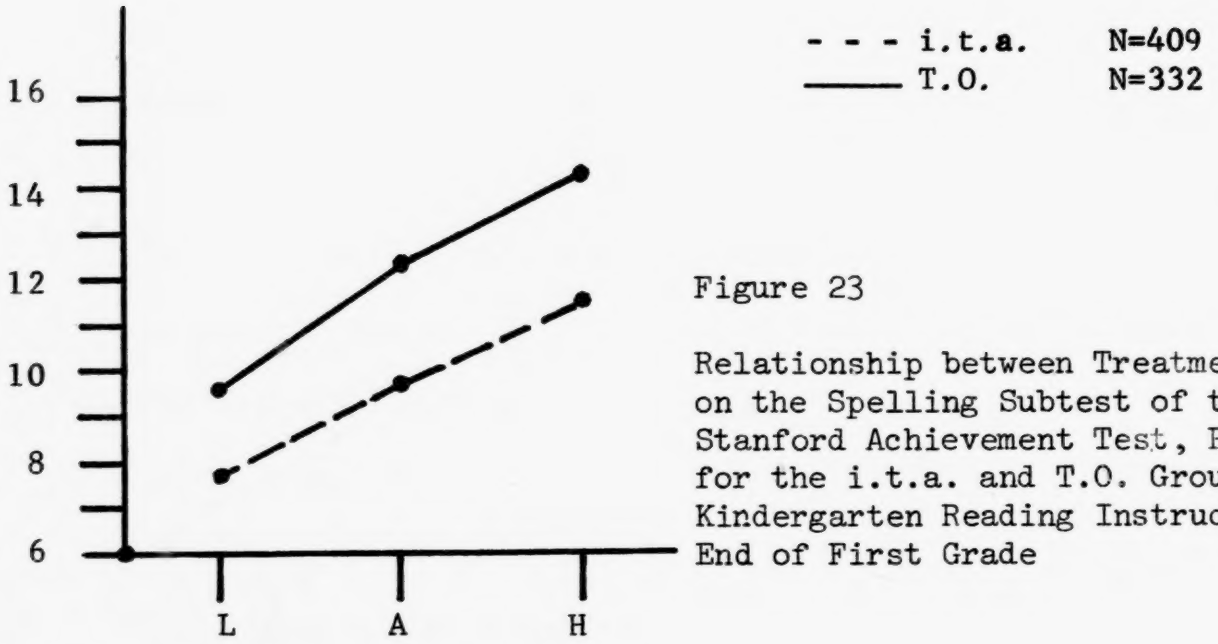

Figure 23

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. and T.O. Groups with Kindergarten Reading Instruction at the End of First Grade tion of the means in Table 36 for the Word Reading subtest reveals very slight differences for each category of intelligence in favor of the i.t.a. group who had begun instruction at the kindergarten level. The slight difference was not statistically significant on the basis of the computed F ratio of .72 (Table 37). There is a significant difference among the three categories of intelligence as indicated by the very significant F ratio. From Figure 24, it can be seen that the means obtained by intelligence category are relatively parallel. This lack of interaction is confirmed in the analysis of variance as the computed F ratio of .14 is not significant.

On the Paragraph Meaning subtest, an examination of the means in Table 38 again reveals slight differences for each I.Q. category. The means of the i.t.a. group with kindergarten instruction are slightly higher for the low- and high-I.Q. categories; however, for the average-I.Q. category, the mean of the i.t.a. group without kindergarten instruction is slightly higher. As reported in the analysis of variance in Table 39 the very slight differences are probably due to chance factors as the computed F ratio is .20, which is not significant. Again, the main effect of intelligence is reflected in the very significant F ratio reported in Table 39. Inspection of Figure 25 reveals the interaction of intelligence and medium of instruction. When tested for significance, an F ratio of .65 was obtained, which is not significant.

## TABLE 36

### TABLE OF MEANS FOR THE i.t.a. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD READING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | i.t.a. WK<br>N=409 | i.t.a. WO/K<br>N=298 |
|---|---|---|---|
| | Low | 21.38 | 20.04 |
| I.Q. | Average | 25.36 | 24.74 |
| | High | 26.72 | 26.47 |

## TABLE 37

### ANALYSIS OF VARIANCE FOR THE WORD READING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE i.t.a. GROUPS WITH (1966) AND WITHOUT (1965) KINDERGARTEN READING INSTRUCTION AT THE END OF FIRST GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 321.71 | 16.65** |
| Method | 1 | 13.98 | .72 |
| I.Q. x M | 2 | 2.67 | .14 |
| Error (within) | 102 | 19.32 | |

** Significant at the .01 level of confidence

TABLE 38

TABLE OF MEANS FOR THE i.t.a. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | i.t.a. WO/K N=298 | i.t.a. WK N=409 |
|---|---|---|---|
| | Low | 16.39 | 18.69 |
| I.Q. | Average | 24.21 | 23.13 |
| | High | 25.85 | 26.25 |

TABLE 39

ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE i.t.a. GROUPS WITH (1966) AND WITHOUT (1965) KINDERGARTEN READING INSTRUCTION AT THE END OF FIRST GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 651.36 | 17.43** |
| Method | 1 | 7.41 | .20 |
| I.Q. x M | 2 | 24.44 | .65 |
| Error (within) | 102 | 37.37 | |

** Significant at the .01 level of confidence

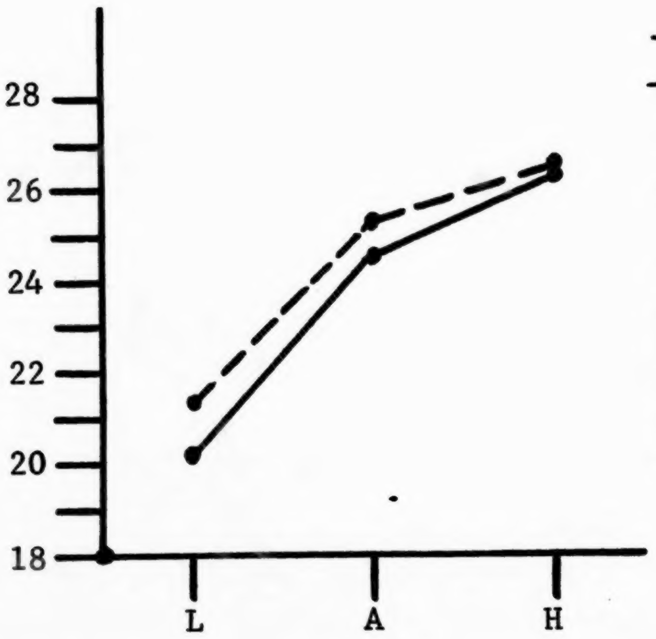

Figure 24

Relationship between Treatment and I.Q. on the Word Reading Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. Groups with and without Kindergarten Reading Instruction, at the End of First Grade

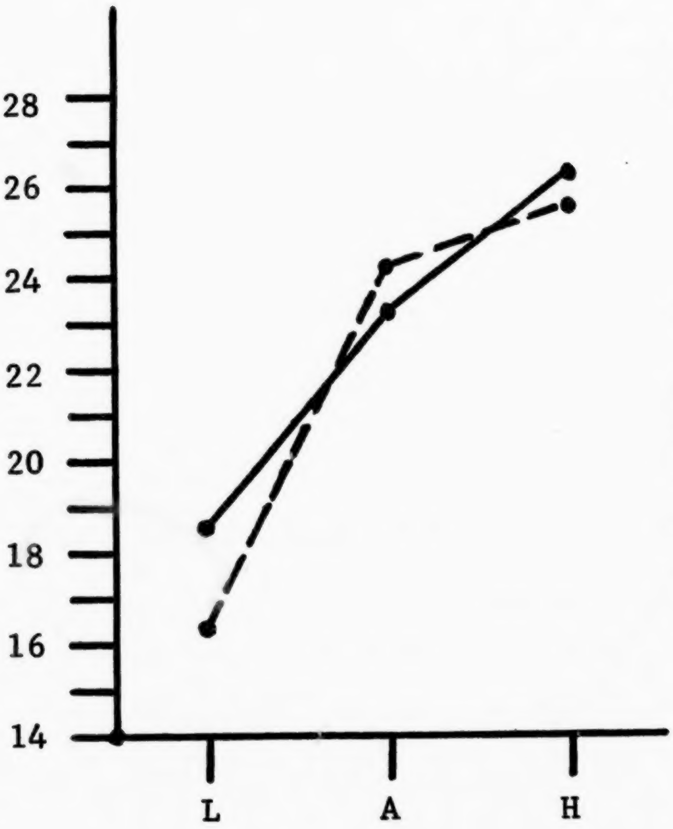

Figure 25

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. Groups with and without Kindergarten Reading Instruction, at the End of First Grade

## TABLE 40

## TABLE OF MEANS FOR THE i.t.a. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | i.t.a. WO/K N=298 | i.t.a. WK N=409 |
|---|---|---|---|
| | Low | 36.78 | 36.50 |
| I.Q. | Average | 41.82 | 41.37 |
| | High | 44.77 | 42.37 |

## TABLE 41

## ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE i.t.a. GROUPS WITH (1966) AND WITHOUT (1965) KINDERGARTEN READING INSTRUCTION AT THE END OF FIRST GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 433.00 | 10.85** |
| Method | 1 | 27.83 | .70 |
| I.Q. x M | 2 | 11.88 | .30 |
| Error (within) | 102 | 39.91 | |

** Significant at the .01 level of confidence

## TABLE 42

## TABLE OF MEANS FOR THE i.t.a. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | i.t.a. WO/K N=298 | i.t.a. WK N=409 |
|---|---|---|---|
| | Low | 7.75 | 7.92 |
| I.Q. | Average | 9.69 | 9.93 |
| | High | 10.32 | 11.20 |

## TABLE 43

## ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE i.t.a. GROUPS WITH (1966) AND WITHOUT (1965) KINDERGARTEN READING INSTRUCTION AT THE END OF FIRST GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 83.90 | 11.09** |
| Method | 1 | 4.69 | .65 |
| I.Q. x M | 2 | 1.30 | .17 |
| Error (within) | 102 | 7.57 | |

** Significant at the .01 level of confidence

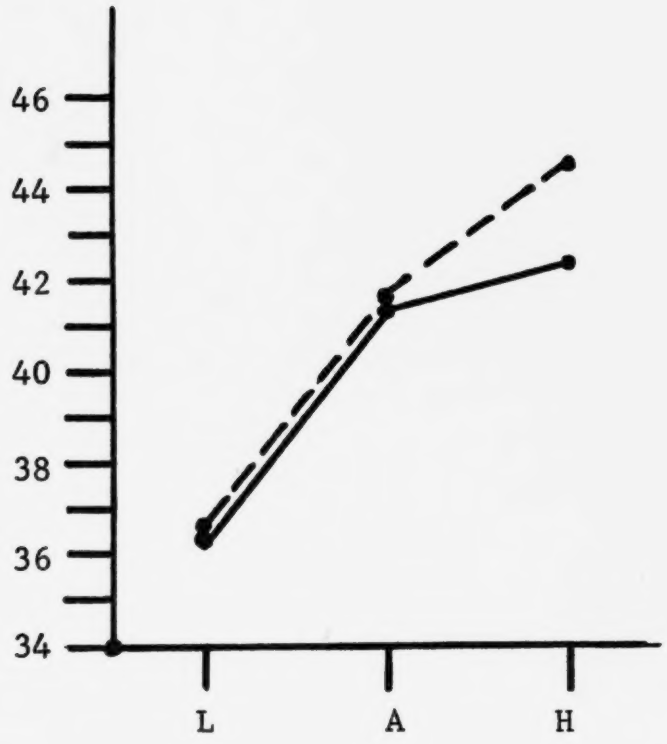

Figure 26

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. Groups with and without Kindergarten Reading Instruction, at the End of First Grade

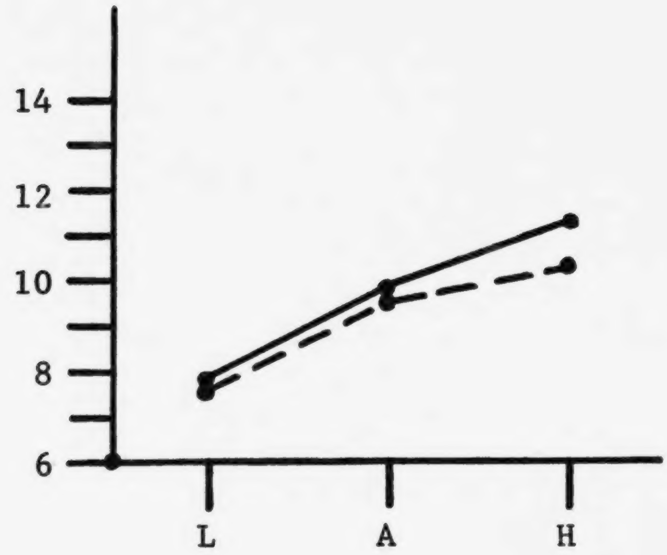

Figure 27

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. Groups with and without Kindergarten Reading Instruction, at the End of First Grade

On the Word Study Skills subtest, an inspection of Table 40 reveals that the difference between means for each category of intelligence is very slight. All differences favor the group without kindergarten instruction. These minor differences are certainly not significant as the extremely small F ratio of .70 suggests. Again, the F ratio for intelligence is significant at well beyond the .01 level. An inspection of Figure 26 shows lines that practically coincide, for the low and average I.Q. categories. The computed F ratio for interaction is .30, which is certainly not significant. There is again a significant difference for the main effect of intelligence beyond the .01 level of confidence, demonstrating that the differences among the three I.Q. categories are significant.

On the Spelling subtest, for which results are reported in Table 43, there are no significant differences between the i.t.a. groups in spelling ability. The computed F ratio of .65 suggests that the small differences are not significant. There is again a significant difference for the main effect of intelligence, as indicated by the very large F ratio of 11.09, which is significant at beyond the .01 level. The lack of interaction between intelligence and medium of instruction can be seen from the computed F ratio of .17, which is certainly not significant. This is graphically revealed in Figure 27.

As can be seen from the preceding results, none of the subtests in reading and spelling revealed significant results. The results were relatively similar whether children had received instruction at the kindergarten level in i.t.a. or had not received such instruction. Hence, it would appear that introducing reading at a kindergarten level in i.t.a. produces no better results in reading and spelling achievement than a normal kindergarten readiness program.

The third hypothesis predicted that introducing reading in traditional orthography to kindergarten children will not result in significantly better reading and spelling achievement than that attained by children who were formally introduced to reading in T.O. in first grade, when both groups are measured at the end of first grade. Tables 44, 46, 48 and 50 report the means by I.Q. category for the Word Reading, Paragraph Meaning, Word Study Skills and Spelling subtests of the Stanford Achievement Test, Primary I. As can be seen, the differences between pairs of means for each of the I.Q. categories for the two treatment groups are all generally relatively small. An analysis of variance was computed for each of the reading subtests and for the Spelling subtest, and are reported in Tables 45, 47, 49 and 51. An examination of the results reveals that none of the F ratios is significant. The only F ratio which approaches significance was obtained for Paragraph Meaning. The performance of the T.O. group without kindergarten instruction was superior on this subtest to that of the T.O. group with kindergarten instruction. However, this superiority was not found significant. Figures 28 through 31 graphically compare the means by intelligence category on each of the reading subtests and on the Spelling subtest for the two treatment groups. The analyses of variance computed for the interaction of intelligence and treatment, the results of which are reported in Tables 45, 47, 49 and 51, reveal a lack of significant interaction, as none of the F ratios is significant. Further analyses of variance were carried out to determine whether intelligence had any differentiating effect on achievement. As can be seen in Tables 45, 47, 49 and 51, the F ratio in each analysis is significant at beyond the .01 level of confidence. These results suggest that differences among the intelligence categories are strongly significant.

On the basis of the preceding results, it would appear that beginning reading instruction at the kindergarten level in traditional orthography does not produce better reading and spelling achievement than when reading instruction is postponed until first grade. Thus, the hypothesis that no difference will occur regardless of the time at which instruction begins is confirmed.

The fourth hypothesis predicted that introducing reading in i.t.a. to kindergarten children would result in significantly better reading and spelling achievement than that attained by children who were formally introduced to reading in first grade in T.O., when both groups are measured at the end of first grade.

On the Word Reading subtest, the average performance of the i.t.a. group with kindergarten reading instruction was slightly higher than the T.O. group without kindergarten instruction for each category of intelligence. The analysis of variance computed for these means can be seen in Table 53. The obtained F ratio of 4.14 is significant at the .05 level of confidence. Hence, the i.t.a. group with kindergarten instruction was significantly superior in Word Reading when compared to the T.O. group without kindergarten instruction. Again, there is a significant difference at well beyond the

## TABLE 44

### TABLE OF MEANS FOR THE T.O. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD READING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | T.O. WO/K N=248 | T.O. WK N=332 |
|---|---|---|---|
| | Low | 18.34 | 19.27 |
| I.Q. | Average | 23.54 | 22.12 |
| | High | 26.29 | 23.54 |

## TABLE 45

### ANALYSIS OF VARIANCE FOR THE WORD READING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE T.O. GROUPS WITH (1966) AND WITHOUT (1965) KINDERGARTEN READING INSTRUCTION AT THE END OF FIRST GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 281.97 | 15.08** |
| Method | 1 | 26.68 | 1.43 |
| I.Q. x M | 2 | 27.59 | 1.48 |
| Error (within) | 94 | 18.70 | |

**Significant at the .01 level of confidence

TABLE 46

TABLE OF MEANS FOR THE T.O. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | T.O. WO/K N=248 | T.O. WK N=332 |
|---|---|---|---|
| | Low | 17.93 | 17.31 |
| I.Q. | Average | 21.82 | 20.17 |
| | High | 27.64 | 25.17 |

TABLE 47

ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE T.O. GROUPS WITH (1966) AND WITHOUT (1965) KINDERGARTEN READING INSTRUCTION AT THE END OF FIRST GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 622.92 | 22.39** |
| Method | 1 | 58.39 | 2.10 |
| I.Q. x M | 2 | 6.79 | .24 |
| Error (within) | 94 | 27.82 | |

**Significant at the .01 level of confidence

## TABLE 48

### TABLE OF MEANS FOR THE T.O. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | T.O. WO/K N=248 | T.O. WK N=332 |
|---|---|---|---|
| | Low | 35.24 | 33.51 |
| I.Q. | Average | 39.09 | 39.28 |
| | High | 45.08 | 41.22 |

## TABLE 49

### ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE T.O. GROUPS WITH (1966) AND WITHOUT (1965) KINDERGARTEN READING INSTRUCTION AT THE END OF FIRST GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 620.17 | 15.03** |
| Method | 1 | 74.73 | 1.81 |
| I.Q. x M | 2 | 32.20 | .78 |
| Error (within) | 94 | 41.26 | |

**Significant at the .01 level of confidence

## TABLE 50

### TABLE OF MEANS FOR THE T.O. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | T.O. WO/K<br>N=248 | T.O. WK<br>N=332 |
|---|---|---|---|
| | Low | 10.24 | 9.70 |
| I.Q. | Average | 12.01 | 12.26 |
| | High | 15.58 | 14.12 |

## TABLE 51

### ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE T.O. GROUPS WITH (1966) AND WITHOUT (1965) KINDERGARTEN READING INSTRUCTION AT THE END OF FIRST GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 190.15 | 15.72** |
| Method | 1 | 7.74 | .64 |
| I.Q. x M | 2 | 5.76 | .48 |
| Error (within) | 94 | 12.10 | |

**Significant at the .01 level of confidence

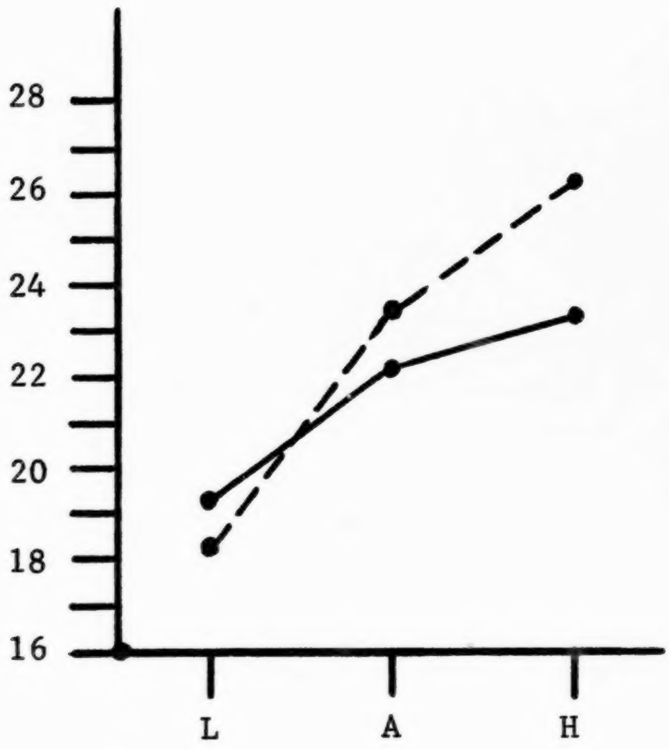

Figure 28

Relationship between Treatment and I.Q. on the Word Reading Subtest of the Stanford Achievement Test, Primary I, for the T.O. Groups with and without Kindergarten Reading Instruction, at the End of First Grade

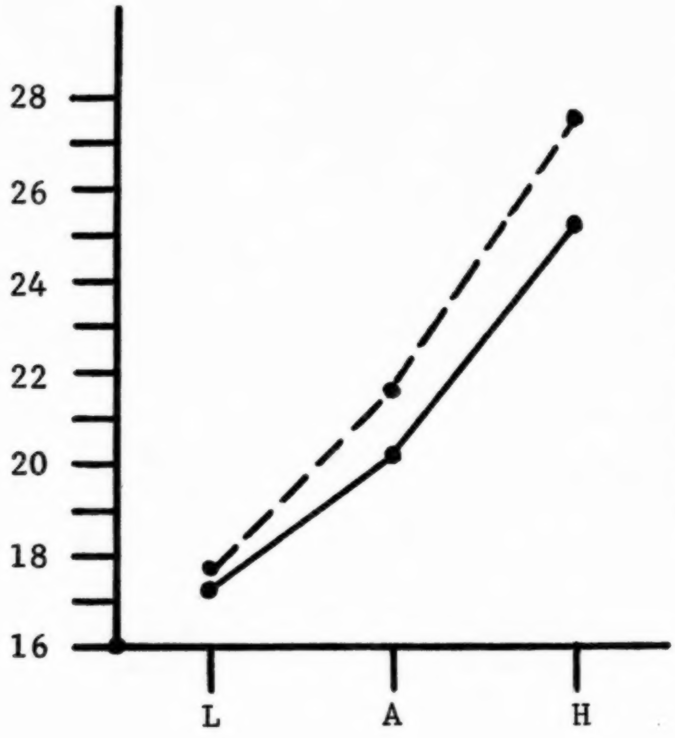

Figure 29

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary I, for the T.O. Groups with and without Kindergarten Reading Instruction, at the End of First Grade

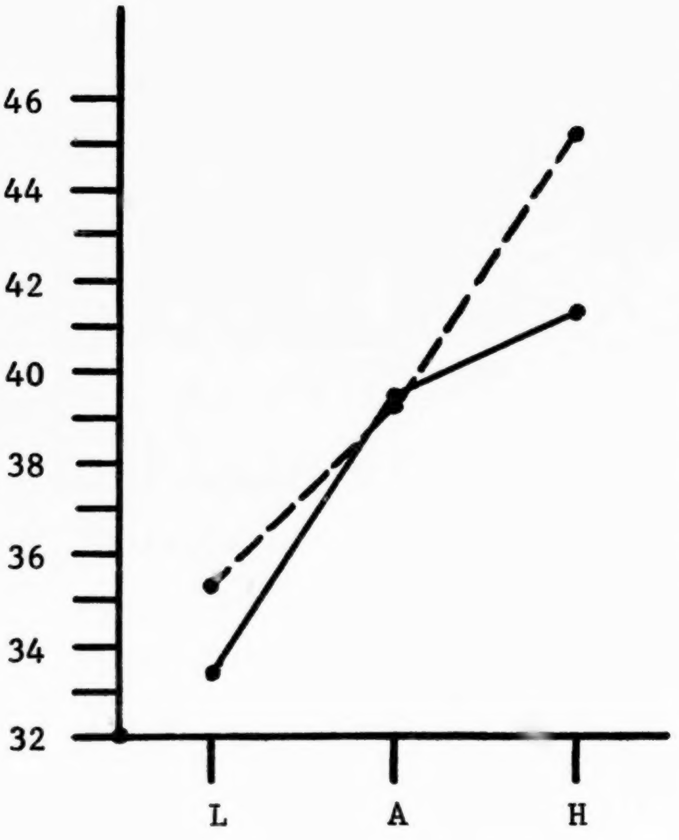

Figure 30

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary I, for the T.O. Groups with and without Kindergarten Reading Instruction, at the End of First Grade

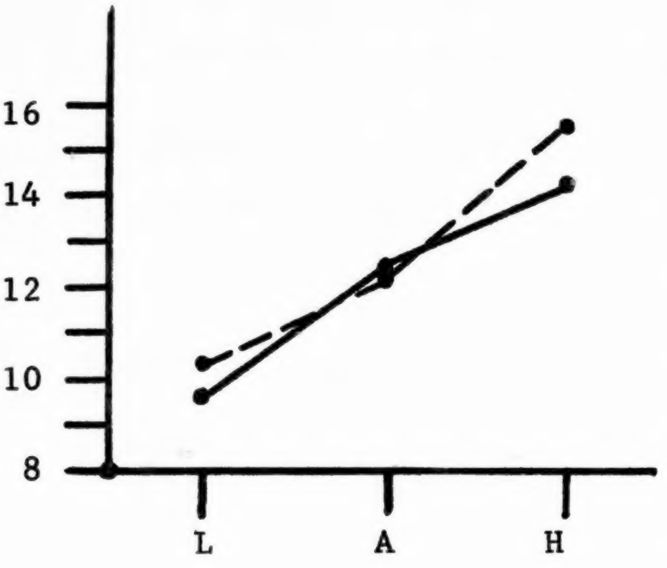

Figure 31

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary I, for the T.O. Groups with and without Kindergarten Reading Instruction, at the End of First Grade

.01 level of confidence for intelligence. Figure 32 presents the comparison of means for each of the two treatment groups for each category of intelligence. It can be seen that the means for the i.t.a. group are slightly higher for each category of intelligence, and the lines are somewhat parallel. The lack of interaction is confirmed statistically as the F ratio for the interaction of intelligence and medium of instruction was .76, which is not significant.

On the Paragraph Meaning subtest, the average performance of the i.t.a. group was slightly higher for the low and average categories of intelligence. However, a small difference in favor of the T.O. group was obtained for the high-I.Q. category. An analysis of variance was computed to determine whether these differences were significant and the result is reported in Table 55. The test of significance yielded an F ratio of .04, which is not significant. Hence, neither group was superior to the other in the area of comprehension, as measured by the Paragraph Meaning subtest. Figure 33 graphically represents the means for each of the two treatment groups by category of intelligence. As can be seen, the line for the i.t.a. group is slightly above that of the T.O. group for the low and average intelligence categories, and virtually coincides with the line for the T.O. group for the high-I.Q. category. The test for interaction effect between intelligence and medium of instruction produced an F ratio of .47, which is not significant. There is a significant difference for intelligence, as is true in all of these analyses of variance relating to the main effect of intelligence.

## TABLE 52

TABLE OF MEANS FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD READING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | T.O. WO/K N=248 | i.t.a. WK N=409 |
|---|---|---|---|
| I.Q. | Low | 18.34 | 21.38 |
| | Average | 23.54 | 25.36 |
| | High | 26.29 | 26.72 |

## TABLE 53

ANALYSIS OF VARIANCE FOR THE WORD READING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1965) AND THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1966) AT THE END OF FIRST GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 367.25 | 19.88** |
| Method | 1 | 76.38 | 4.14* |
| I.Q. x M | 2 | 13.99 | .76 |
| Error (within) | 99 | 18.47 | |

*Significant at the .05 level of confidence
**Significant at the .01 level of confidence

## TABLE 54

### TABLE OF MEANS FOR THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AND THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | T.O. WO/K N=248 | i.t.a. WK N=409 |
|---|---|---|---|
| | Low | 17.93 | 18.69 |
| I.Q. | Average | 21.82 | 23.13 |
| | High | 27.64 | 26.25 |

## TABLE 55

### ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1965) AND THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1966) AT THE END OF FIRST GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 611.94 | 17.35** |
| Method | 1 | 1.28 | .04 |
| I.Q. x M | 2 | 16.65 | .47 |
| Error (within) | 99 | 35.27 | |

**Significant at the .01 level of confidence

On the Word Study Skills subtest, an inspection of Table 56 reveals that the average performance of the i.t.a. group was slightly higher for the low- and average-I.Q. categories. However, a small difference in favor of the T.O. group was observed for the high-I.Q. category. Table 57 reports the calculations for the analysis of variance for this subtest. As can be seen in Table 57 the F ratio of .05 is not significant at the .05 level of confidence, which suggests that the performance of the i.t.a.-taught kindergarten group was similar to the group instructed in T.O. in first grade. Figure 34 graphically presents the means of the two treatment groups by I.Q. category. As can be seen there is a very slight interaction at the high-I.Q. level. However, the test comparing the interaction effect for intelligence produces an F ratio of 1.39 which suggests that the differences observed are likely due to chance variations and not the result of any strong interaction between intelligence and medium of instruction. This suggests that intelligence is not a major factor in determining which medium of instruction should be used. Again, there is a significant difference for intelligence, with a difference among the I.Q. categories being significant at well beyond the .01 level of confidence.

In spelling achievement, the T.O. group who began their reading instruction at a first-grade level was slightly higher for each category of intelligence than that of the i.t.a. group who began reading instruction at a pre-first-grade level. Table 59 reveals that these differences are significant as the obtained F ratio of 25.04 is significant at the .01 level of confidence. This was further verification of the fact that at the end of first grade children instructed in traditional orthography spelled significantly better than those children instructed in i.t.a. whether they had received kindergarten reading instruction in i.t.a. or not. An examination of Figure 35 graphically illustrates the means for each of the two treatment groups by I.Q. category. As can be noted, the means of the T.O. group are slightly higher for each I.Q. category, and the lines are relatively parallel. The lack of interaction is confirmed statistically as the obtained F ratio of 1.57 is not significant. Again the highly significant F ratio of 17.11 for intelligence suggests that there are very significant differences among the three categories of intelligence.

In summary, it would appear that the i.t.a.-instructed group who began reading instruction at a pre-first-grade level was significantly superior to that of the T.O. group who began their reading instruction at a first-grade level in the area of word recognition or Word Reading. No differences were observed between the two treatment groups in the areas of Word Study Skills and Paragraph Meaning or comprehension. In the area of Spelling, the T.O. group was significantly superior to that of the i.t.a. group.

Hypothesis five predicted that introducing i.t.a. to first-grade children will result in significantly better reading and spelling achievement than that attained by children who begin formal reading in kindergarten in T.O., when both groups are measured at the end of first grade.

On the Word Reading subtest, an examination of the means in Table 60 reveals a slightly superior performance for the i.t.a. group without kinder-

## TABLE 56

### TABLE OF MEANS FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Grade Variables | | i.t.a. WK N=409 | T.O. WO/K N=248 |
|---|---|---|---|
| | Low | 36.50 | 35.24 |
| I.Q. | Average | 41.37 | 39.09 |
| | High | 42.37 | 45.08 |

## TABLE 57

### ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1965) AND THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1966) AT THE END OF FIRST GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 479.27 | 11.69** |
| Method | 1 | 1.89 | .05 |
| I.Q. x M | 2 | 56.89 | 1.39 |
| Error (within) | 99 | 41.00 | |

**Significant at the .01 level of confidence

## TABLE 58

## TABLE OF MEANS FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | T.O. WO/K N=248 | i.t.a. WK N=409 |
|---|---|---|---|
| | Low | 10.24 | 7.92 |
| I.Q. | Average | 12.01 | 9.93 |
| | High | 15.58 | 11.20 |

## TABLE 59

## ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1965) AND THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1966), AT THE END OF FIRST GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 143.16 | 17.11** |
| Method | 1 | 209.57 | 25.04** |
| I.Q. x M | 2 | 13.11 | 1.57 |
| Error (within) | 99 | 8.37 | |

**Significant at the .01 level of confidence

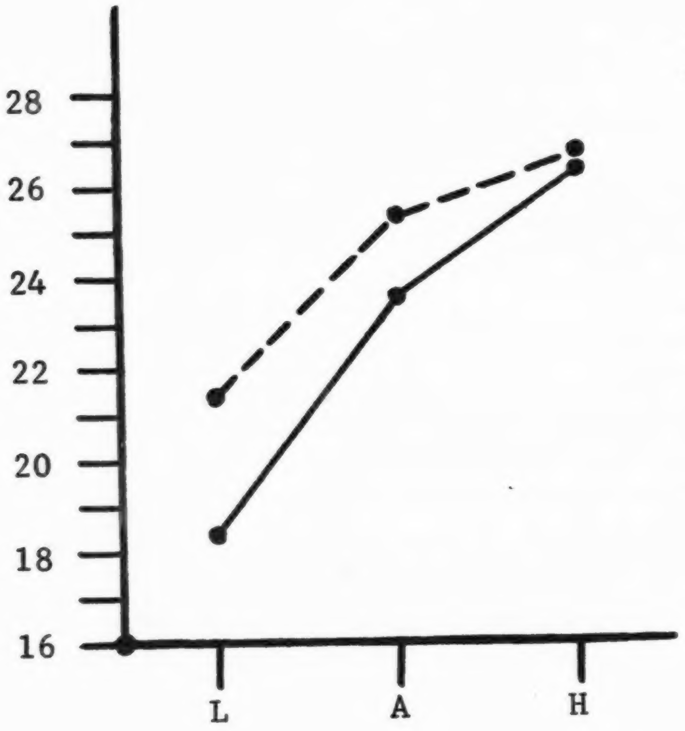

Figure 32

Relationship between Treatment and I.Q. on the Word Reading Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. Group with Kindergarten Reading Instruction, and the T.O. Group without Kindergarten Reading Instruction at the End of First Grade

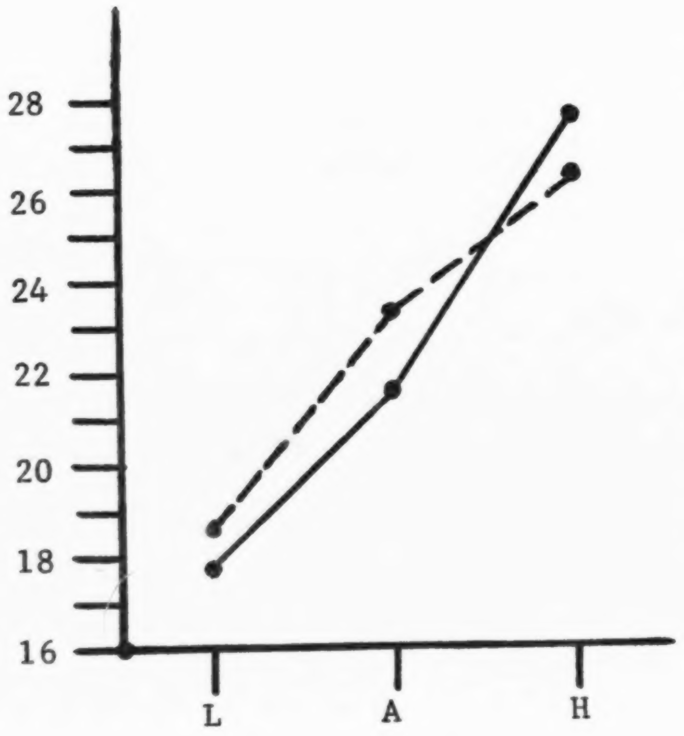

Figure 33

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. Group with Kindergarten Reading Instruction, and the T.O. Group without Kindergarten Reading Instruction at the End of First Grade

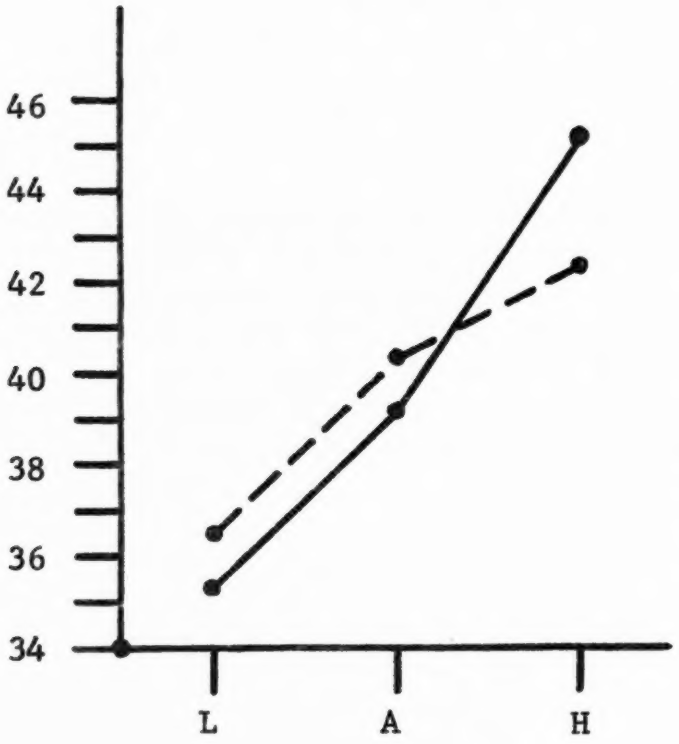

Figure 34

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. Group with Kindergarten Reading Instruction, and the T.O. Group without Kindergarten Reading Instruction at the End of First Grade

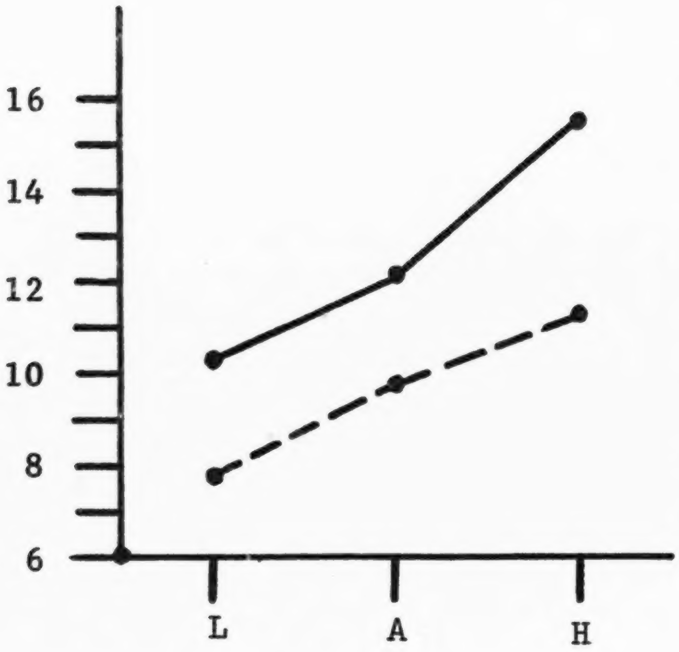

Figure 35

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. Group with Kindergarten Reading Instruction, and the T.O. Group without Kindergarten Reading Instruction at the End of First Grade garten over the T.O. group with kindergarten for each category of intelligence. As can be seen from the analysis of variance in Table 61, the computed F ratio of 5.58 is significant at the .05 level of confidence. There is likewise a significant difference at well beyond the .01 level of confidence for intelligence. Figure 36 graphically represents the means for each of the two treatment groups for each category of intelligence. As can be noted, the means for the i.t.a. group are slightly higher for each category of intelligence, and the lines are somewhat parallel. The lack of interaction is confirmed statistically as the obtained F ratio of .58 is not significant.

On the Paragraph Meaning subtest of the Stanford Achievement Test, Primary I, the differences in means between the two treatment groups are very slight for both the low- and high-I.Q. categories. The difference favors the i.t.a. group in the average- and high-I.Q. categories. For the low-I.Q. category, the T.O. group obtained a higher mean. The analysis of variance computed for these means can be seen in Table 63. As would be expected, the small differences are not significant as the computed F ratio is 1.34, which is not significant. As would be expected, there is a significant difference among the intelligence categories. Figure 37 visually presents the means for each of the I.Q. categories for each of the two treatment groups. Although a slight interaction can be observed, the statistically computed interaction produced an F ratio of 1.77, which is not significant.

## TABLE 60

## TABLE OF MEANS FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION ON THE WORD READING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | i.t.a. WO/K N=298 | T.O. WK N=332 |
|---|---|---|---|
| | Low | 20.04 | 19.27 |
| I.Q. | Average | 24.74 | 22.12 |
| | High | 26.47 | 23.54 |

## TABLE 61

## ANALYSIS OF VARIANCE FOR THE WORD READING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1965) AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1966), AT THE END OF FIRST GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 242.96 | 12.41** |
| Method | 1 | 109.31 | 5.58* |
| I.Q. x M | 2 | 11.44 | .58 |
| Error (within) | 97 | 19.58 | |

*Significant at the .05 level of confidence
**Significant at the .01 level of confidence

## TABLE 62

## TABLE OF MEANS FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | i.t.a. WO/K N=298 | T.O. WK N=332 |
|---|---|---|---|
| | Low | 16.39 | 17.31 |
| I.Q. | Average | 24.21 | 20.17 |
| | High | 25.85 | 25.17 |

## TABLE 63

## ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1965) AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1966) AT THE END OF FIRST GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 621.75 | 20.54** |
| Method | 1 | 40.60 | 1.34 |
| I.Q. x M | 2 | 53.63 | 1.77 |
| Error (within) | 97 | 30.27 | |

**Significant at the .01 level of confidence

In Word Study Skills, the average performance of the i.t.a. group without kindergarten instruction was superior for each category of intelligence. Table 65 reveals that these differences are significant as the computed F ratio of 6.01 is significant at beyond the .05 level of confidence. This suggests that the differences observed in favor of the i.t.a. group are likely due to the medium of instruction rather than chance factors. The F ratio for intelligence was again significant at beyond the .01 level of confidence. Figure 38 graphically represents these mean differences between the two treatment groups. No significant interaction was observed, as the obtained F ratio of .06, which is not significant, testifies.

In spelling achievement, the T.O. group obtained higher means for each category of intelligence. The F ratio obtained in this analysis of 16.94 was significant at the .01 level of confidence. Hence, it would appear that regardless of the time at which reading was initiated on a formal basis, when children are measured at the end of first grade, the group instructed in traditional orthography was significantly better in spelling achievement. Figure 39 illustrates the means of the two treatment groups for each category of intelligence. Comparing the interaction between intelligence and medium, an F ratio of .65 was obtained which suggests that the differences observed are likely due to chance factors and not the result of any strong interaction between intelligence and medium of instruction.

In summary, the i.t.a. group who began reading instruction at a

## TABLE 64

## TABLE OF MEANS FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Grade Variables | | i.t.a. WO/K N=298 | T.O. WK N=332 |
|---|---|---|---|
| | Low | 36.78 | 33.51 |
| I.Q. | Average | 41.82 | 39.28 |
| | High | 44.77 | 41.22 |

## TABLE 65

## ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1965) AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1966), AT THE END OF FIRST GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 561.88 | 14.02** |
| Method | 1 | 240.84 | 6.01* |
| I.Q. x M | 2 | 2.23 | .06 |
| Error (within) | 97 | 40.08 | |

*Significant at the .05 level of confidence
**Significant at the .01 level of confidence

## TABLE 66

TABLE OF MEANS FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, AT THE END OF FIRST GRADE

| Group Variables | | i.t.a. WO/K N=298 | T.O. WK N=332 |
|---|---|---|---|
| | Low | 7.75 | 9.70 |
| I.Q. | Average | 9.69 | 12.26 |
| | High | 10.32 | 14.12 |

## TABLE 67

ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY I, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1965) AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1966), AT THE END OF FIRST GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 112.80 | 10.13** |
| Method | 1 | 188.70 | 16.94** |
| I.Q. x M | 2 | 7.23 | .65 |
| Error (within) | 97 | 11.14 | |

**Significant at the .01 level of confidence

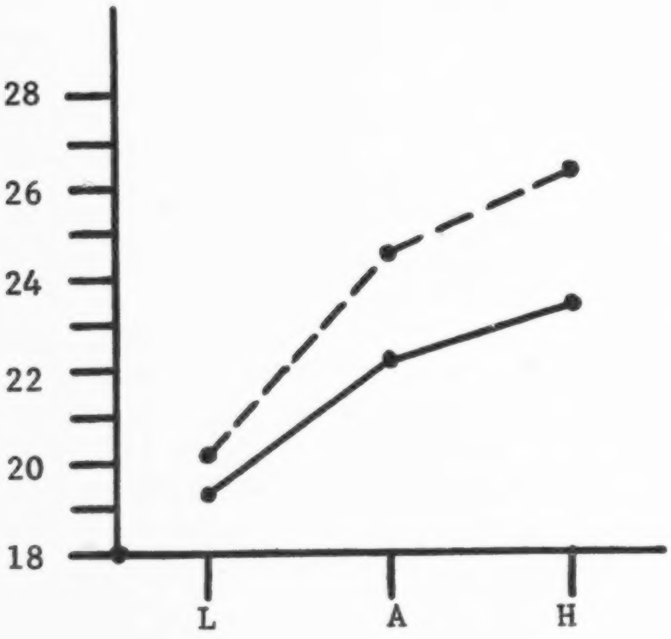

Figure 36

Relationship between Treatment and I.Q. on the Word Reading Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. Group without Kindergarten Reading Instruction, and the T.O. Group with Kindergarten Reading Instruction at the End of First Grade

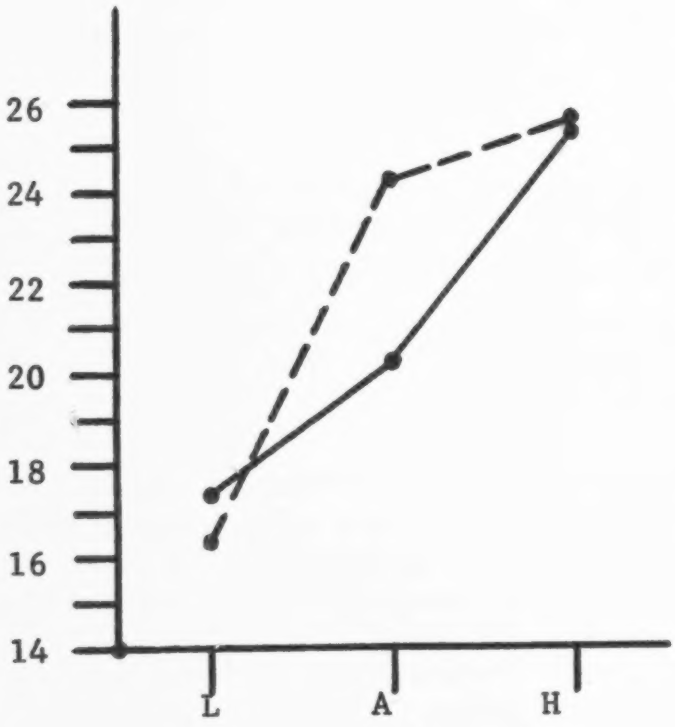

Figure 37

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. Group without Kindergarten Reading Instruction, and the T.O. Group with Kindergarten Reading Instruction at the End of First Grade

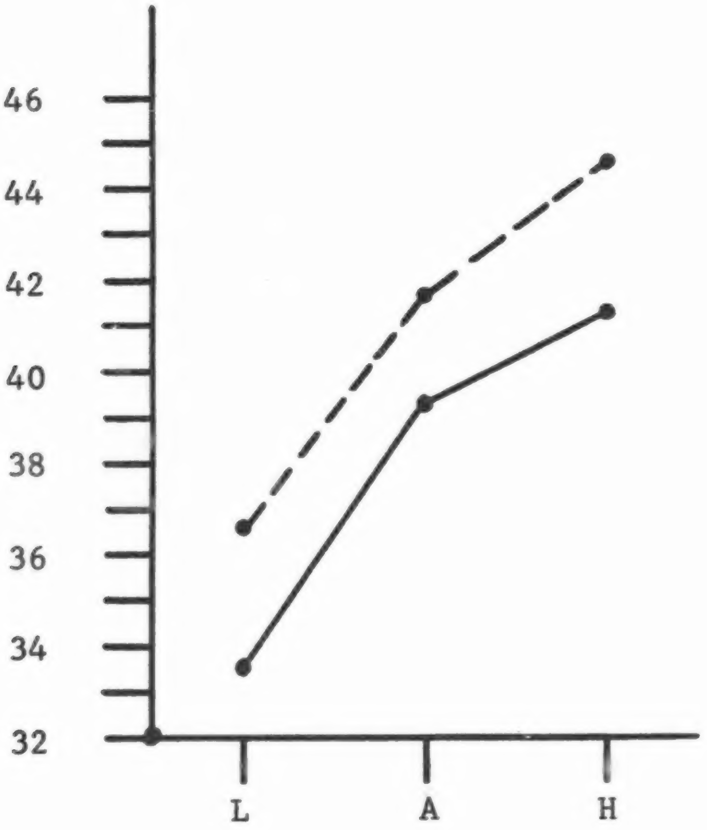

Figure 38

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. Group without Kindergarten Reading Instruction, and the T.O. Group with Kindergarten Reading Instruction at the End of First Grade

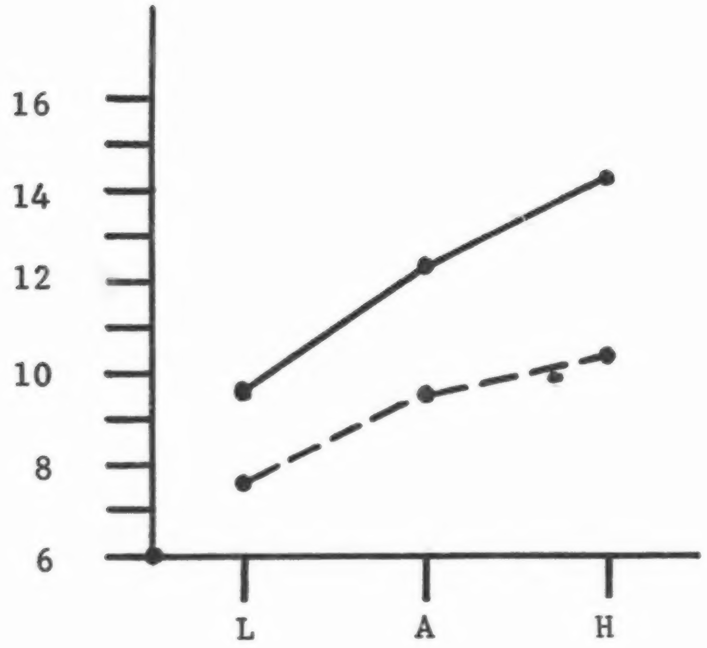

Figure 39

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary I, for the i.t.a. Group without Kindergarten Reading Instruction, and the T.O. Group with Kindergarten Reading Instruction, at the End of First Grade first-grade level was significantly superior in the areas of word recognition and word analysis when compared to the T.O. group who began reading instruction at a pre-first-grade level. No differences were observed in the area of comprehension, as measured by the Paragraph Meaning subtest. The spelling achievement of those children who were instructed in T.O. was significantly higher than the spelling performance of those children instructed in i.t.a.

The sixth hypothesis stated that introducing reading in i.t.a. to first-grade children would result in significantly better reading and spelling achievement than that attained by children who are formally introduced to reading in first grade in traditional orthography, when both groups are measured at the end of second grade.

Table 68 illustrates the mean achievement of each of the two treatment groups by I.Q. category for the Word Meaning subtest of the Stanford Achievement Test, Primary II. From Table 68 it can be seen that at the end of second grade the i.t.a. children scored higher on the Word Meaning subtest for each of the three I.Q. categories. The means were 19.13 and 17.01 for the low-I.Q. group; 22.41 and 19.25 for the average-I.Q. group; and 24.18 and 23.60 for the high-I.Q. group, for i.t.a. and T.O. respectively. Figure 40 represents these results visually. As can be seen in Figure 40, the lines are relatively parallel suggesting no interaction between intelligence and medium. This is statistically confirmed by the F ratio of 1.04 which is not significant. The linearity observed for each of the two groups suggests that intelligence and Word Meaning achievement are highly related. This also is verified by the highly significant F ratio of 20.64 as revealed in Table 69. The discrepancy observed between the two lines, with the i.t.a. line being the higher, was tested for significance on an analysis of variance. The F ratio computed was 7.05, which for 1 and 75 degrees of freedom would be significant beyond the .01 level of confidence. This suggests that learning to read initially in the Initial Teaching Alphabet results in higher achievement in Word Meaning than learning to read in traditional orthography. The differences observed were greater between the media of instruction than they were among classrooms. Hence, the medium was a more significant variable than the teacher in this case.

The means presented in Table 70 represent the results for the Paragraph Meaning subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. groups by I.Q. category, when measured at the end of second grade. As can be seen in Table 70 the mean Paragraph Meaning scores were virtually the same among the low-I.Q. children. For the high-I.Q. children the T.O. group scored significantly higher. In the average intelligence range the mean of the i.t.a. group was considerably higher than the mean of the T.O. group. As can be seen in Figure 41 no consistent superiority can be observed for either of the two groups in each of the three I.Q. categories. Hence, some interaction seems to result. As revealed in Table 71 the F ratio computed for the interaction in this case was 1.92, which for 2 and 75 degrees of freedom would not be significant. Hence, the interaction observed could be the result of chance. The main effect of intelligence may also be observed in Table 71 as being significant at well beyond the .01 level of confidence. This suggests that there are significant differences in the three I.Q. categories. The F ratio computed for the difference between media yielded a result of .33, which is less than one and certainly not significant. Hence, in the area of comprehension, at the end of second grade, no significant differences between the two groups were observed. In this particular case the differences among the teachers are greater than the differences between the two treatment groups.

The means shown in Table 72 represent the results of the Word Study Skills subtest of the Stanford Achievement Test, Primary II, by I.Q. category for the i.t.a.- and T.O.-instructed groups at the end of second grade. As can be seen in Table 72, the means for the i.t.a. group are higher than the means for the T.O. group for each of the three I.Q. categories. The means respectively for the i.t.a. and T.O. groups were 36.55 and 33.77 for the low-intelligence category; 44.81 and 39.77 for the average-I.Q. category; and 48.60 and 46.23 for the high-I.Q. category. Figure 42 represents these results visually. As can be seen in Figure 42 the two lines are relatively parallel, with the i.t.a. means being higher for each of the three I.Q. categories, suggesting no interaction between method and intelligence. The lack of interaction is confirmed by the non-significant F ratio of .13. The regression line for the i.t.a. group is higher than that of the T.O. group, and this difference was tested for significance. As shown in Table 73, the resulting F ratio was 4.93, which for one and 75 degrees of freedom would be significant at the .05 level of confidence. Hence, it would appear that the word analysis ability of the i.t.a. group was significantly better than that of the T.O. group, and that this difference resulted from the media rather than from the differences among the teachers. Again, the main effect of intelligence can be observed by the significant F ratio of 26.38, suggesting that there are significant differences in the three categories of intelligence.

On the Spelling subtest, the means obtained for spelling ability were higher for the i.t.a.-instructed group than for the T.O.-instructed group for each of the three I.Q. categories. The greatest difference was observed for the average-I.Q. group, while the differences for the low- and the high-I.Q. groups were extremely small. As can be seen in Figure 43, the lines are relatively parallel, suggesting very little interaction between intelligence and the medium of instruction. The obtained F ratio is .95 which is not significant. As in all of the other subtests, linearity is again observed between intelligence and spelling achievement. The highly significant F ratio for intelligence suggests that there is a very significant difference among the three categories of intelligence. To test the significance of the difference observed in favor of the i.t.a. group, an analysis of variance was computed and yielded an F ratio of 1.74 for 1 and 75 degrees of freedom, as revealed in Table 75. This would not be significant at the .05 level of confidence. Hence, the difference in spelling in favor of the i.t.a. group could have resulted from chance. Since at the end of first grade the i.t.a. group was significantly poorer in spelling, this result suggests that after these children have been instructed in traditional orthography for a period of time their spelling was certainly no worse than that of children instructed in traditional orthography from the very beginning.

In summary, when reading instruction begins at the first-grade level,

TABLE 68

TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE, 1966

| Group Variables | | i.t.a.<br>N=298 | T.O.<br>N=248 |
|---|---|---|---|
| | Low | 19.13 | 17.01 |
| I.Q. | Average | 22.41 | 19.25 |
| | High | 24.18 | 23.60 |

TABLE 69

[illegible]YSIS OF VARIANCE FOR THE WORD MEANING SUBTEST OF THE STANFORD [illegible]HIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 226.61 | 20.64** |
| Method | 1 | 77.38 | 7.05** |
| I.Q. x M | | 11.38 | 1.04 |
| Error (within) | 75 | 10.98 | |

**Significant at the .01 level of confidence

## TABLE 70

## TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE, 1966

| Group Variables | | i.t.a.<br>N=298 | T.O.<br>N=248 |
|---|---|---|---|
| | Low | 29.29 | 28.83 |
| I.Q. | Average | 38.49 | 34.21 |
| | High | 40.57 | 42.93 |

## TABLE 71

## ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1087.50 | 27.93** |
| Method | 1 | 12.72 | .33 |
| I.Q. x M | 2 | 74.94 | 1.92 |
| Error (within) | 75 | 38.94 | |

**Significant at the .01 level of confidence

## TABLE 72

## TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE, 1966

| Group Variables | | i.t.a.<br>N=298 | T.O.<br>N=248 |
|---|---|---|---|
| | Low | 36.55 | 33.77 |
| I.Q. | Average | 43.81 | 39.77 |
| | High | 48.60 | 46.23 |

## TABLE 73

## ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1014.64 | 26.38** |
| Method | 1 | 189.45 | 4.93* |
| I.Q. x M | 2 | 5.11 | .13 |
| Error (within) | 75 | 38.46 | |

**Significant at the .01 level of confidence
*Significant at the .05 level of confidence

## TABLE 74

## TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE, 1966

| Group Variables | | i.t.a. N=298 | T.O. N=248 |
|---|---|---|---|
| | Low | 14.58 | 14.00 |
| I.Q. | Average | 17.96 | 15.21 |
| | High | 19.80 | 19.77 |

## TABLE 75

## ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 204.59 | 14.04** |
| Method | 1 | 25.28 | 1.74 |
| I.Q. x M | 2 | 13.87 | .95 |
| Error (within) | 75 | 14.57 | |

**Significant at the .01 level of confidence

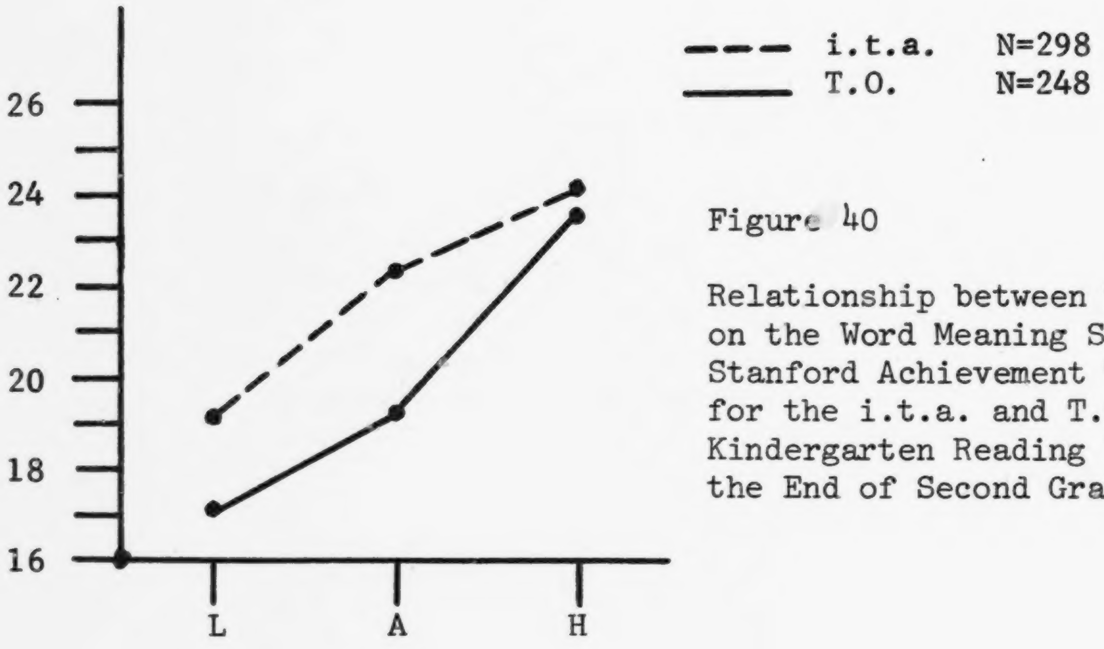

Figure 40

Relationship between Treatment and I.Q. on the Word Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. Groups without Kindergarten Reading Instruction, at the End of Second Grade, 1966

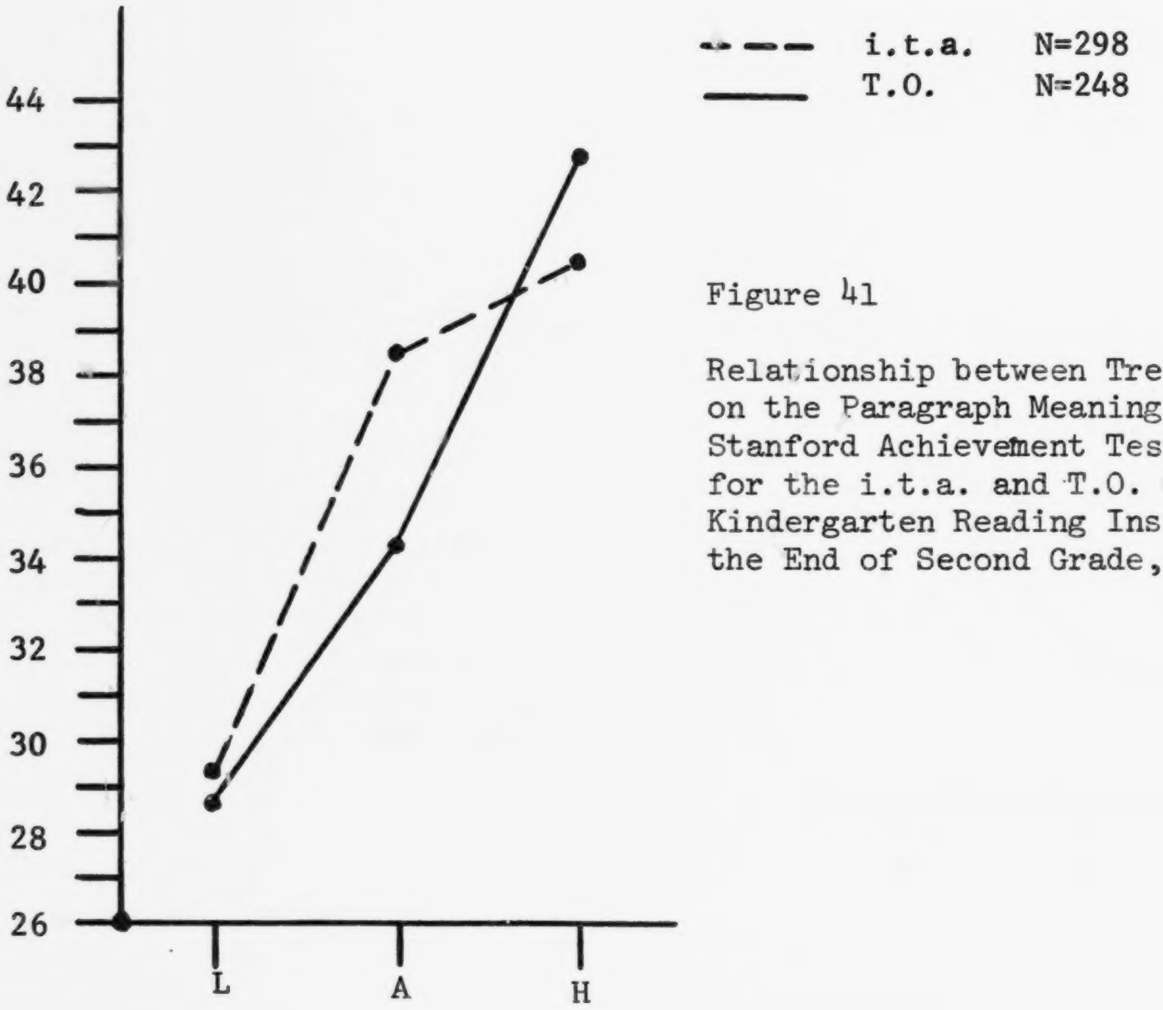

Figure 41

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. Groups without Kindergarten Reading Instruction, at the End of Second Grade, 1966

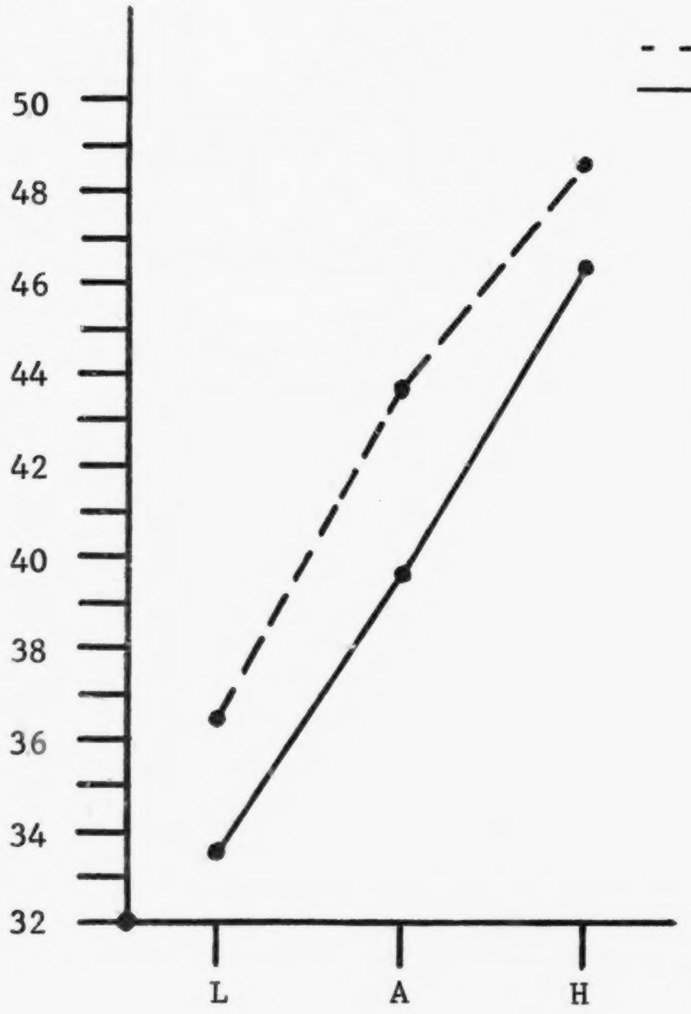

Figure 42

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. Groups without Kindergarten Reading Instruction, at the End of Second Grade, 1966

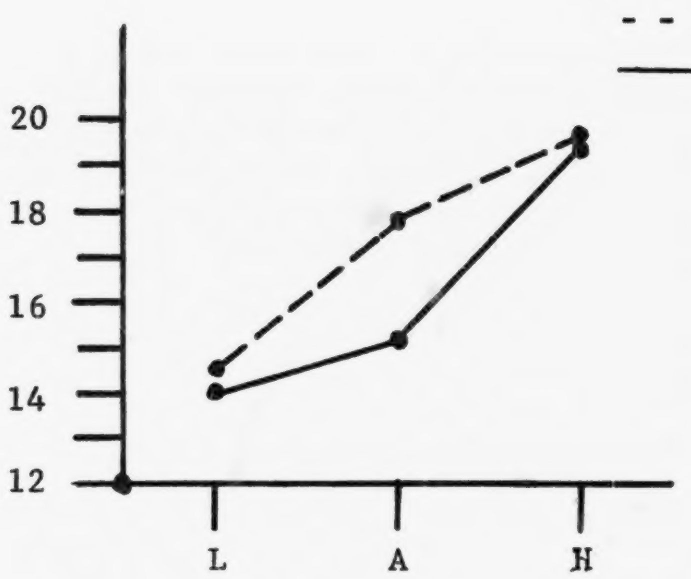

Figure 43

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. Groups without Kindergarten Reading Instruction, at the End of Second Grade, 1966 children instructed in i.t.a. are significantly superior to those instructed in T.O. in Word Meaning and Word Study Skills, when measured at the end of second grade. No significant differences between the two groups are observed on the Paragraph Meaning subtest, which measures comprehension and spelling ability. It would appear, therefore, that i.t.a. produces better word recognition and word analysis skills than does T.O. instruction, but the slight differences in favor of i.t.a. in comprehension and spelling could have occurred as a result of chance.

The conclusions obtained in the second year of the study, 1965-66, reveal the following:

1. Introducing a consistent medium such as i.t.a. to kindergarten children in a formal reading program does result in significantly better word recognition, word analysis and comprehension than that attained by children who learn in traditional orthography in kindergarten when both groups of children are measured at the end of first grade.
2. Introducing a consistent medium such as i.t.a. to kindergarten children in a formal reading program does result in significantly poorer spelling achievement than that attained by children who learned in traditional orthography in kindergarten when both groups are measured at the end of first grade.
3. Introducing a consistent medium such as i.t.a. to kindergarten children does not result in significantly better reading and spelling achievement than that attained by children who begin

formal reading instruction in first grade in i.t.a. when both groups are measured at the end of first grade.

4. Introducing reading in traditional orthography to kindergarten children does not result in significantly better reading and spelling achievement than that attained by children who are formally introduced to reading in traditional orthography in first grade when both groups are measured at the end of first grade.
5. Introducing reading in i.t.a. to kindergarten children results in significantly higher word recognition than that attained by children who are formally introduced to reading in first grade in T.O. when both groups are measured at the end of first grade.
6. Introducing reading in i.t.a. to kindergarten children does not result in significantly better comprehension or word analysis than that attained by children introduced to reading in first grade in T.O.
7. Introducing reading in i.t.a. to kindergarten children results in significantly poorer spelling achievement than that attained by children formally introduced to reading in first grade in T.O.
8. Introducing i.t.a. to first-grade children results in significantly better word recognition and word analysis than that attained by children who begin formal reading in kindergarten in T.O. when both groups are measured at the end of first grade.
9. Introducing i.t.a. to first-grade children does not result in

better comprehension than that attained by children who begin formal reading in kindergarten in traditional orthography. The spelling achievement of children who begin formal reading instruction in kindergarten in traditional orthography is significantly better than the spelling achievement of children introduced to reading for the first time in first grade in i.t.a.

10. Introducing reading instruction to first-grade children in i.t.a. does result in significantly better word meaning and word study skills than that attained by children who begin reading instruction in first grade in traditional orthography when both groups are measured at the end of second grade.
11. Introducing reading instruction tc first-grade children in i.t.a. does not result in significantly better comprehension than that attained by children who begin reading instruction in first grade in traditional orthography when both groups are measured at the end of second grade. No significant difference was noted in spelling achievement between the i.t.a.- and T.O.-taught groups.

As determined from the analysis of variance, intelligence would not seem to be a major factor in determining whether the i.t.a. or the T.O. medium would be more effective for instruction. It was generally true that children instructed in the Initial Teaching Alphabet were significantly better in word recognition and word analysis at all levels of intelligence. Thus, it would not appear that intelligence should be a major determinant in deciding upon the medium of instruction for a child in beginning reading.

## End-of-Year Results: Third-Year Analysis of Variance

The first hypothesis tested was the effect of introducing a consistent medium such as i.t.a. to kindergarten children in a formal reading program as compared to the introduction of formal reading to children who learned in traditional orthography in kindergarten, when both groups are measured at the end of second grade on reading and spelling achievement.

Table 76 presents the means by I.Q. category on each of the subtests of the Stanford Achievement Test, Primary II, for the i.t.a. group with kindergarten reading experience and for the T.O. group with kindergarten reading experience. Also reported in Table 76 are the means on each of the Stanford subtests for the i.t.a. and T.O. children who had not begun reading instruction at the kindergarten level and who completed third grade at the end of the third year of the study. As may be observed in the table of means, the average scores obtained by the i.t.a.-instructed kindergarten group were higher than the means obtained for the T.O.-instructed kindergarten group at each of the three levels of intelligence for each of the three reading subtests and for the Spelling subtest of the Stanford. However, no significant differences were observed in any of these subtests, with the results of only one of the analyses approaching significance. As can be seen in Tables 78, 80, 82 and 84, none of the obtained F ratios was statistically significant. In Word Study Skills, on which an F ratio of 3.99 was obtained, a ratio of 4.01 would have been required for significance at the .05 level of confidence. Further analyses of variance were carried out to determine whether intelligence had any differentiating effect on achievement. As can be seen in each analysis of variance, the obtained F ratio is significant at beyond the .01 level of confidence. This consistent finding demonstrates that there are significant differences in the I.Q.'s of the three intelligence categories. Children in the high-I.Q. category obtained the highest means while children in the low-I.Q. category obtained the lowest. From each of the graphs in Figures 44 through 47, it can be seen that the lines are relatively parallel and that there is no significant interaction between intelligence and the medium of instruction. These observations are confirmed by the non-significant F ratios reported in Tables 78, 80, 82 and 84.

In summary, when formal reading instruction is introduced at the kindergarten level, and reading achievement is measured at the end of second grade, no advantage is found for either the i.t.a. group or the T.O. population in Word Meaning, Paragraph Meaning, Word Study Skills, and Spelling. These results differ from those obtained at the end of the first grade, where the i.t.a. group was significantly higher in Word Meaning, Paragraph Meaning and Word Study Skills, and significantly lower in Spelling.

The second hypothesis predicted that introducing a consistent medium such as i.t.a. to kindergarten children would result in significantly better reading and spelling achievement than that attained by children who began formal reading instruction in first grade in i.t.a. when both groups are measured at the end of second grade. An examination of the table of means reveals that the performance of those children who began their reading instruction at a first-grade level in i.t.a. was somewhat better on each

TABLE 76

TABLE OF MEANS FOR i.t.a. AND T.O. GROUPS AT THE END OF SECOND AND THIRD GRADES ON THE (1) WORD MEANING, (2) PARAGRAPH MEANING, (3) SPELLING, (4) WORD STUDY SKILLS SUBTESTS OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AND THE COMPOSITE READING SCORE

| | | | (END OF SECOND GRADE) | | | | | | | | (END OF THIRD GRADE) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | i.t.a. W/K | | T.O. W/K* | | i.t.a. WO/K | | T.O. WO/K | | i.t.a. WO/K | | T.O. WO/K** |
| | I.Q. | N | | | | | | | | | | | |
| | Low | 101 | 18.85 | 90 | 17.89 | 90 | 19.51 | 78 | 17.31 | 74 | 24.59 | 81 | 23.86 |
| W.M. (1) | Average | 133 | 22.58 | 83 | 20.69 | 82 | 23.29 | 61 | 19.56 | 97 | 27.88 | 58 | 26.83 |
| | High | 121 | 24.71 | 84 | 23.65 | 88 | 24.83 | 67 | 23.30 | 89 | 30.33 | 67 | 29.94 |
| | Low | | 30.68 | | 29.57 | | 30.81 | | 29.47 | | 37.84 | | 38.89 |
| P.M. (2) | Average | | 37.50 | | 34.92 | | 40.35 | | 34.44 | | 45.08 | | 43.55 |
| | High | | 41.96 | | 40.65 | | 42.25 | | 42.63 | | 49.48 | | 49.46 |
| | Low | | 15.58 | | 14.21 | | 14.96 | | 14.08 | | 20.76 | | 22.02 |
| SP. (3) | Average | | 17.51 | | 17.32 | | 18.93 | | 15.85 | | 24.80 | | 22.59 |
| | High | | 19.79 | | 19.48 | | 20.95 | | 18.96 | | 25.91 | | 25.31 |
| | Low | | 37.69 | | 34.86 | | 37.76 | | 34.04 | | 45.19 | | 43.85 |
| WSS (4) | Average | | 43.85 | | 41.53 | | 45.56 | | 41.00 | | 52.63 | | 48.43 |
| | High | | 48.50 | | 46.12 | | 48.65 | | 46.72 | | 56.17 | | 52.84 |
| | Low | | 7.51 | | 7.10 | | 8.69 | | 7.94 | | 10.79 | | 10.67 |
| CRS (5) | Average | | 8.96 | | 8.35 | | 10.73 | | 9.27 | | 12.54 | | 11.91 |
| | High | | 9.91 | | 9.51 | | 11.37 | | 11.02 | | 13.59 | | 13.27 |

*With Kindergarten
**Without Kindergarten

## TABLE 77

## TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION ON THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE, 1967

| Group Variables | | i.t.a.<br>N=355 | T.O.<br>N=257 |
|---|---|---|---|
| | Low | 18.85 | 17.89 |
| I.Q. | Average | 22.58 | 20.69 |
| | High | 24.71 | 23.65 |

## TABLE 78

## ANALYSIS OF VARIANCE FOR THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION, AT THE END OF SECOND GRADE, 1967

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 414.64 | 13.65** |
| Method | 1 | 86.68 | 2.85 |
| I.Q. x M | 2 | 9.94 | .33 |
| Error (within) | 58 | 30.37 | |

**Significant at the .01 level of confidence

TABLE 79

TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE, 1967

| Group Variables | | i.t.a.<br>N=355 | T.O.<br>N=257 |
|---|---|---|---|
| | Low | 30.68 | 29.57 |
| I.Q. | Average | 37.50 | 34.92 |
| | High | 41.96 | 40.65 |

TABLE 80

ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION, AT THE END OF SECOND GRADE, 1967

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1773.22 | 23.55** |
| Method | 1 | 68.57 | .91 |
| I.Q. x M | 2 | 2.60 | .03 |
| Error (within) | 58 | 75.29 | |

**Significant at the .01 level of confidence

## TABLE 81

## TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE, 1967

| Group Variables | | i.t.a.<br>N=355 | T.O.<br>N=257 |
|---|---|---|---|
| | Low | 15.58 | 14.21 |
| I.Q. | Average | 17.51 | 17.32 |
| | High | 19.79 | 19.48 |

## TABLE 82

## ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION, AT THE END OF SECOND GRADE, 1967

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 272.81 | 5.90** |
| Method | 1 | .02 | .00 |
| I.Q. x M | 2 | 10.14 | .22 |
| Error (within) | 58 | 46.26 | |

**Significant at the .01 level of confidence

## TABLE 83

### TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE, 1967

| Group Variables | | i.t.a. N=355 | T.O. N=257 |
|---|---|---|---|
| | Low | 37.69 | 34.86 |
| I.Q. | Average | 43.85 | 41.53 |
| | High | 48.50 | 46.12 |

## TABLE 84

### ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION, AT THE END OF SECOND GRADE, 1967

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1661.90 | 14.50** |
| Method | 1 | 457.73 | 3.99 |
| I.Q. x M | 2 | 8.64 | .08 |
| Error (within) | 58 | 114.61 | |

**Significant at the .01 level of confidence

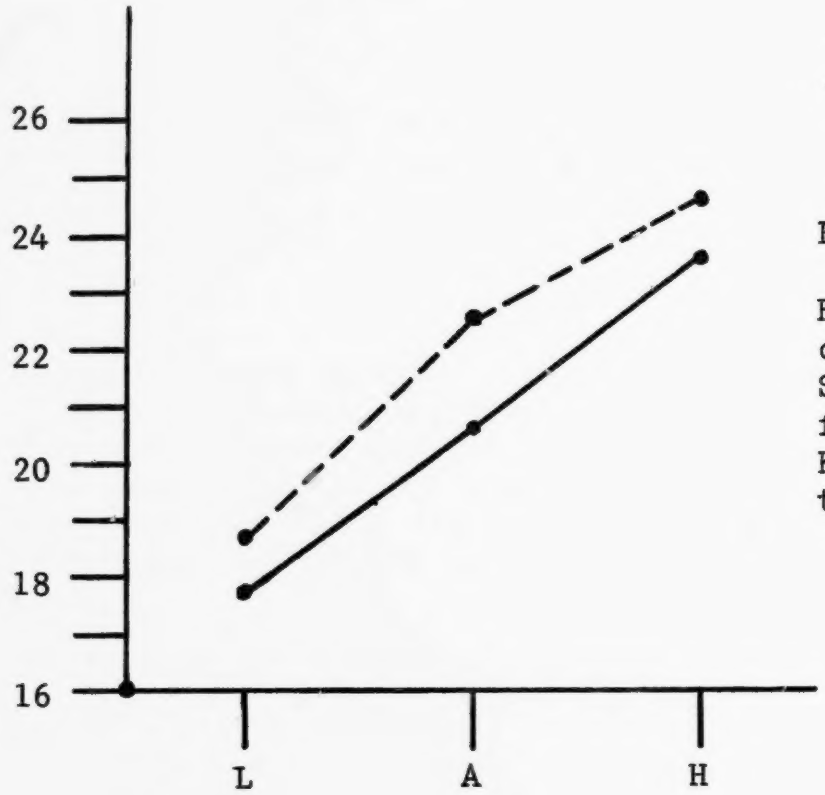

Figure 44

Relationship between Treatment and I.Q. on the Word Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. Groups with Kindergarten Reading Instruction, at the End of Second Grade

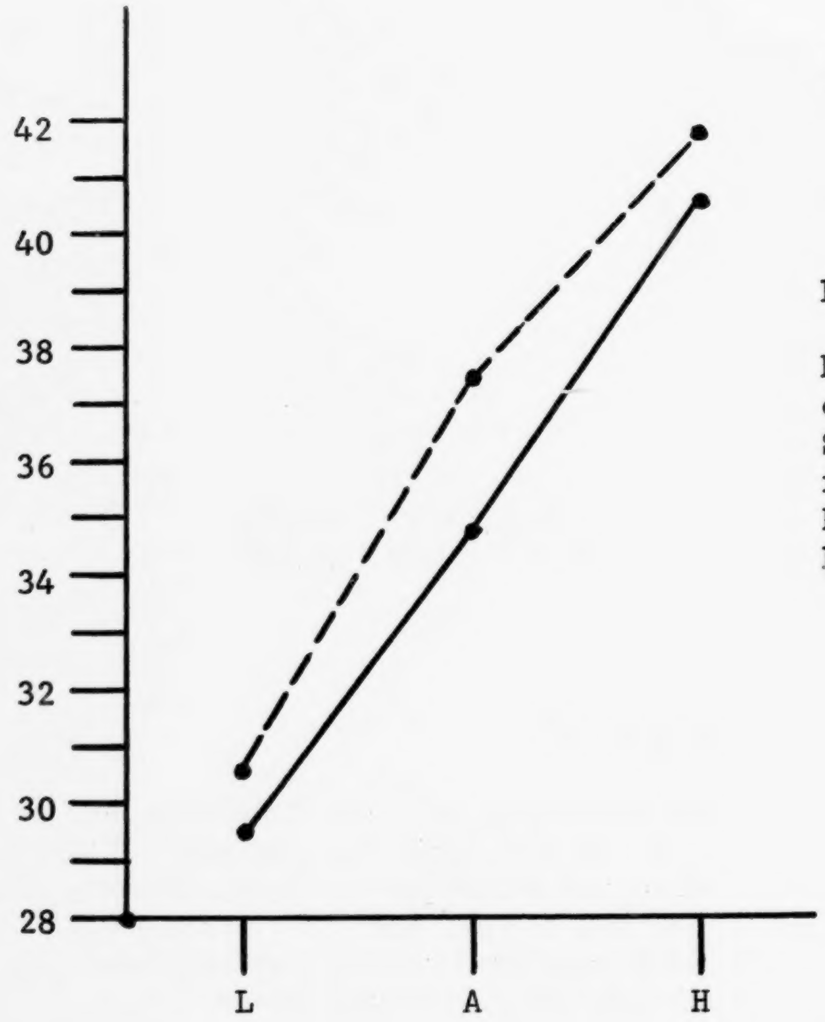

Figure 45

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. Groups with Kindergarten Reading Instruction, at the End of Second Grade

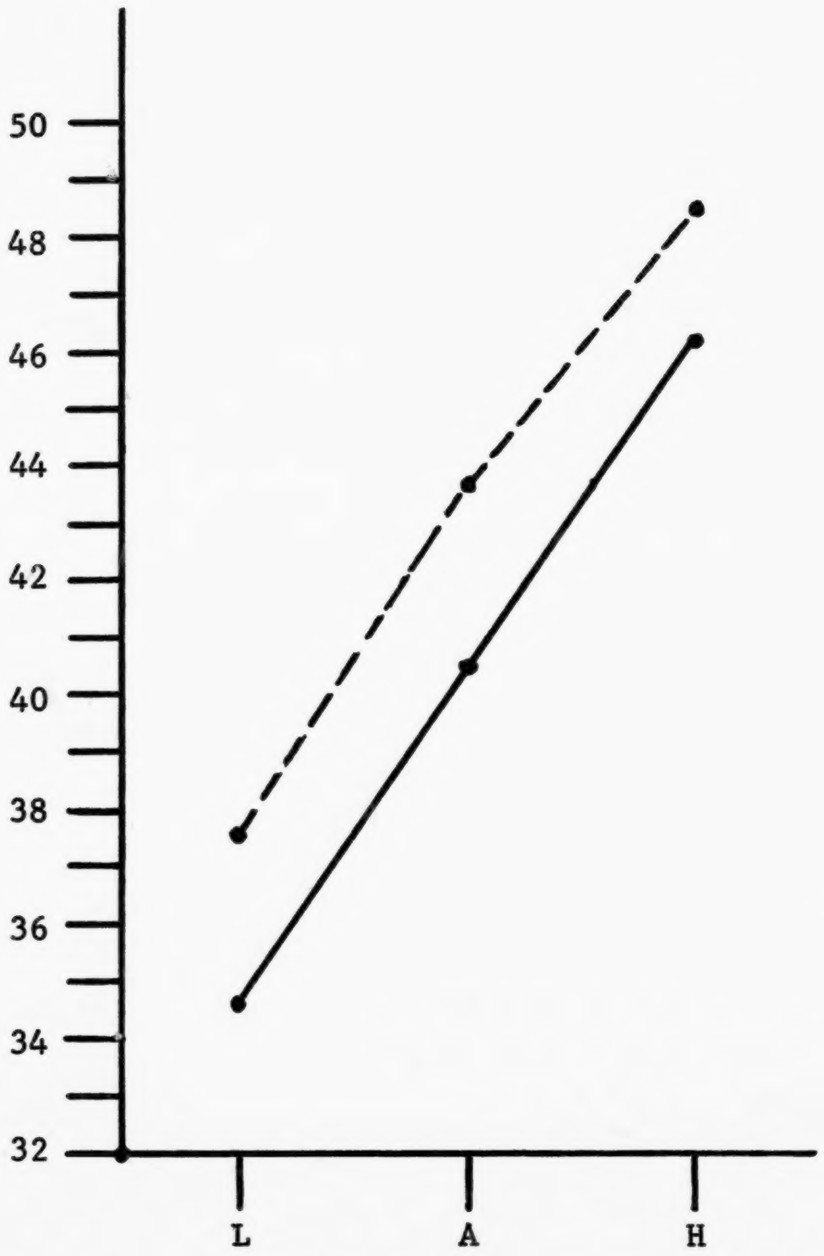

Figure 46

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. Groups with Kindergarten Reading Instruction at the End of Second Grade

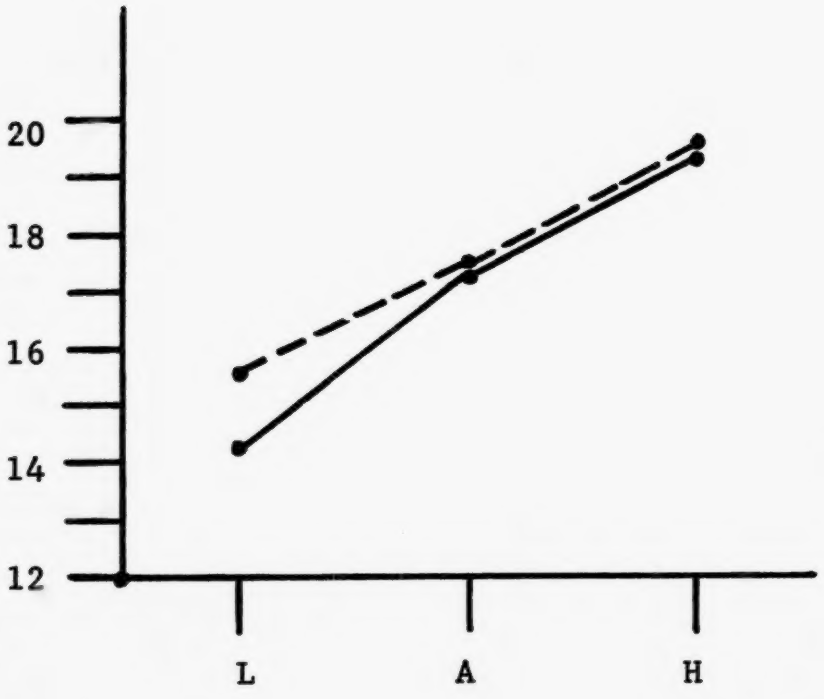

Figure 47

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. Groups with Kindergarten Reading Instruction at the End of Second Grade reading subtest and in spelling for each I.Q. category, with one exception. This exception was for the low-I.Q. category for Spelling where the mean of the i.t.a. group with kindergarten reading experience was slightly higher. Tables 86, 88, 90 and 92 present the analyses of variance for each of the reading subtests and in Spelling. As may be observed in each of these analyses, none of the F ratios approaches significance at the .05 level of confidence. Hence, significant differences were not obtained in reading and Spelling achievement. These results suggest that observed differences are likely due to chance factors. The main effect of intelligence can be observed as being significant in each subtest analysis. In each case the F ratio for intelligence is significant at well beyond the .01 level of confidence. Also, in each analysis, an examination of the interaction of intelligence and medium of instruction yields an F ratio of less than 1, which is not significant. Figures 48 through 51 graphically illustrate the slightly higher means of the i.t.a. group without kindergarten reading instruction, and confirms the lack of interaction between intelligence and medium of instruction.

In summary, these results suggest that reading and spelling achievement is relatively similar regardless of whether children had received reading instruction in i.t.a. at the kindergarten level, or had not received such instruction until first grade. Thus it would appear that introducing reading instruction in i.t.a. at the kindergarten level did not produce superior achievement in reading and spelling by the end of second grade.

## TABLE 85

### TABLE OF MEANS FOR THE i.t.a. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Group Variables | | i.t.a.<br>N=355 | T.O.<br>N=260 |
|---|---|---|---|
| | Low | 18.85 | 19.51 |
| I.Q. | Average | 22.58 | 23.29 |
| | High | 24.71 | 24.83 |

## TABLE 86

### ANALYSIS OF VARIANCE FOR THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1967), AND THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1966), AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 402.43 | 22.96** |
| Method | 1 | 10.24 | .58 |
| I.Q. x M | 2 | 3.65 | .21 |
| Error (within) | 50 | 17.53 | |

**Significant at the .01 level of confidence

## TABLE 87

## TABLE OF MEANS FOR THE i.t.a. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Group Variables | | i.t.a.<br>N=355 | T.O.<br>N=260 |
|---|---|---|---|
| | Low | 30.68 | 30.81 |
| I.Q. | Average | 37.50 | 40.35 |
| | High | 41.96 | 42.25 |

## TABLE 88

## ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1967), AND THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1966), AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1558.92 | 24.38** |
| Method | 1 | 18.22 | .28 |
| I.Q. x M | 2 | 10.38 | .16 |
| Error (within) | 50 | 63.94 | |

**Significant at the .01 level of confidence

## TABLE 89

## TABLE OF MEANS FOR THE i.t.a. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Group Variables | | i.t.a.<br>N=355 | T.O.<br>N=260 |
|---|---|---|---|
| | Low | 15.58 | 14.96 |
| I.Q. | Average | 17.51 | 18.93 |
| | High | 19.79 | 20.95 |

## TABLE 90

## ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1967), AND THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1966), AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 213.99 | 7.14** |
| Method | 1 | 23.86 | .80 |
| I.Q. x M | 2 | 4.10 | .14 |
| Error (within) | 50 | 29.98 | |

**Significant at the .01 level of confidence

## TABLE 91

### TABLE OF MEANS FOR THE i.t.a. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Group Variables | | i.t.a.<br>N=355 | T.O.<br>N=260 |
|---|---|---|---|
| | Low | 37.69 | 37.76 |
| I.Q. | Average | 43.85 | 45.56 |
| | High | 48.50 | 48.65 |

## TABLE 92

### ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1967), AND THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1966), AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1596.23 | 23.09** |
| Method | 1 | 77.74 | 1.12 |
| I.Q. x M | 2 | 2.00 | .03 |
| Error (within) | 50 | 69.13 | |

**Significant at the .01 level of confidence

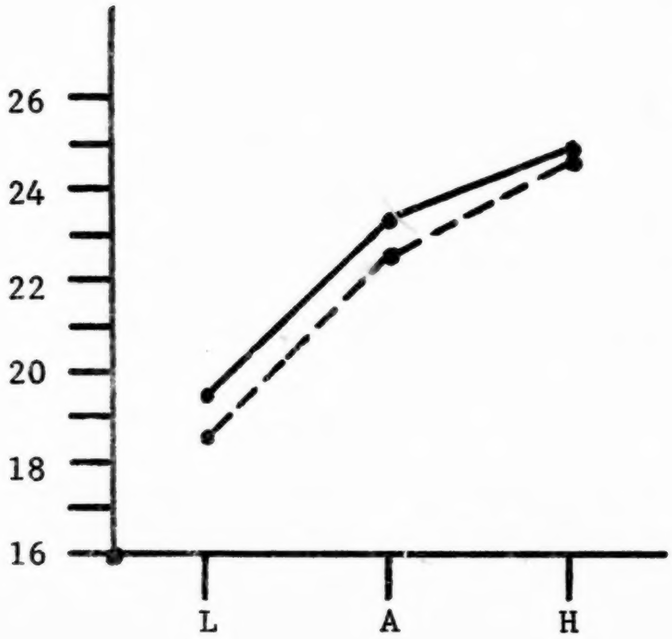

Figure 48

Relationship between Treatment and I.Q. on the Word Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Groups with and without Kindergarten Reading Instruction, at the End of Second Grade

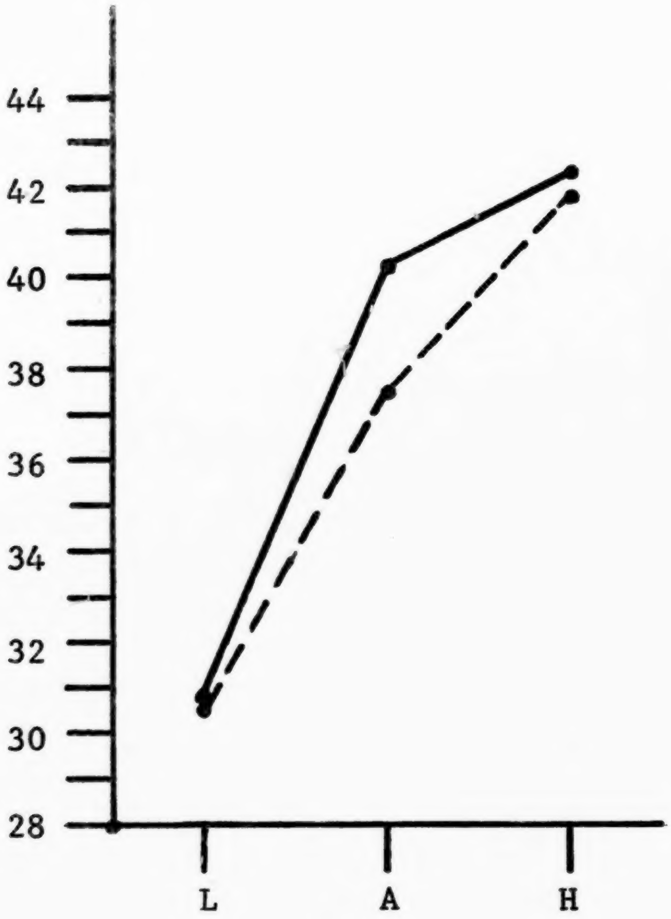

Figure 49

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Groups with and without Kindergarten Reading Instruction, at the End of Second Grade

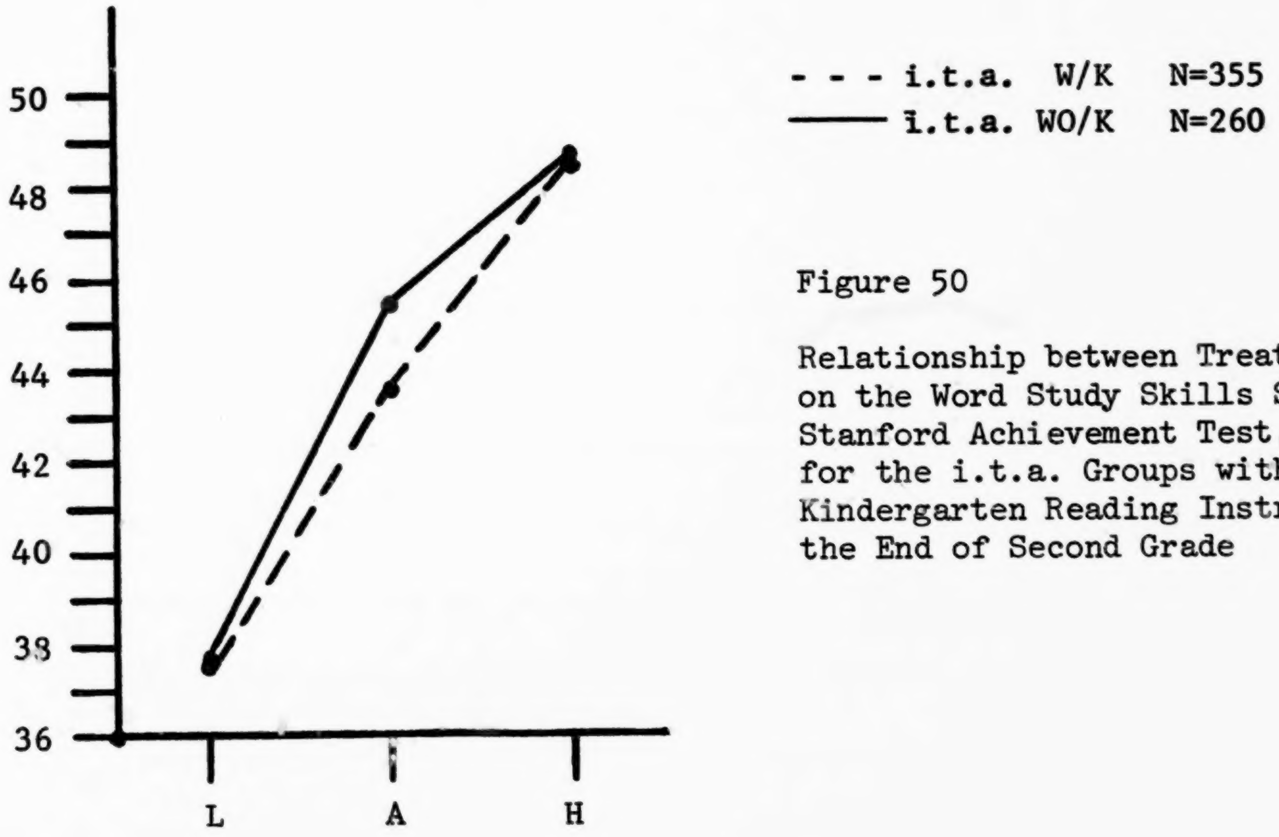

Figure 50

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Groups with and without Kindergarten Reading Instruction, at the End of Second Grade

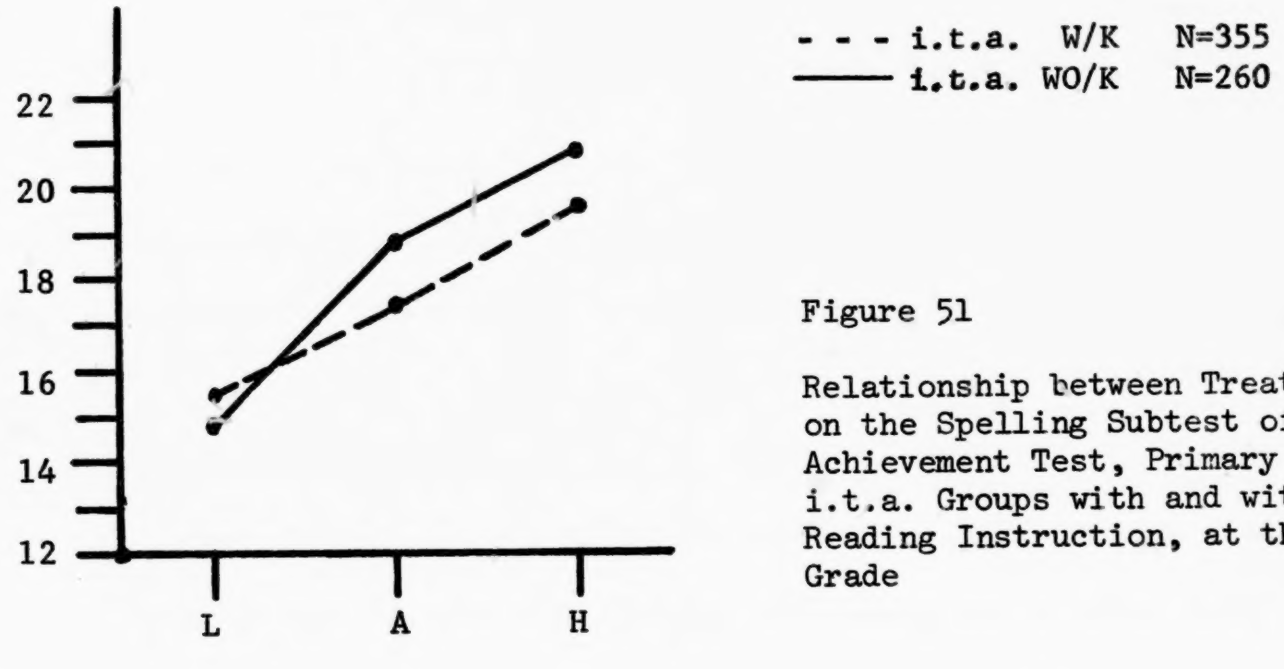

Figure 51

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Groups with and without Kindergarten Reading Instruction, at the End of Second Grade

Hypothesis three stated that introducing reading in traditional orthography to kindergarten children would not result in significantly better reading and spelling achievement than that attained by children who are formally introduced to reading in T.O. in first grade, when both groups are measured at the end of second grade. Tables 94, 96, 98 and 100 report the results of the analyses of variance in Word Meaning, Paragraph Meaning, Word Study Skills, and Spelling. An examination of the means in Tables 93, 95, 97 and 99 reveals very slight differences for each category of intelligence, with the means of the T.O. group whose reading instruction had begun at a first-grade level, slightly higher on each of the reading subtests and in Spelling, with two exceptions. These exceptions were for the high-I.Q. category in both Paragraph Meaning and Word Study Skills, with the mean of the T.O. group without kindergarten reading instruction being slightly higher in each case. An inspection of the analyses of variance results, Tables 94, 96, 98 and 100, reveal that each of the F ratios obtained for the differences was less than 1 and, hence, would not be considered significant. Again, the main effect of intelligence is revealed by the significant F ratios in Tables 94, 96, 98 and 100. In each analysis it may be observed that the differences among I.Q. categories were significant at beyond the .01 level of confidence. From each of the graphs in Figures 52 to 55, it can be seen that the lines are relatively parallel and that no significant interaction between intelligence and medium is observed. These observations are confirmed by the non-significant F ratios reported in Tables 94, 96, 98 and 100.

## TABLE 93

### TABLE OF MEANS FOR THE T.O. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Group Variables | | T.O. WK<br>N=257 | T.O. WO/K<br>N=206 |
|---|---|---|---|
| | Low | 17.89 | 17.31 |
| I.Q. | Average | 20.69 | 19.56 |
| | High | 23.65 | 23.30 |

## TABLE 94

### ANALYSIS OF VARIANCE FOR THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1967), AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1966), AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 243.39 | 8.09** |
| Method | 1 | 2.43 | .08 |
| I.Q. x M | 2 | 12.62 | .42 |
| Error (within) | 45 | 30.08 | |

**Significant at the .01 level of confidence

## TABLE 95

## TABLE OF MEANS FOR THE T.O. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Group Variables | | T.O. WK<br>N=257 | T.O. WO/K<br>N=206 |
|---|---|---|---|
| | Low | 29.57 | 29.47 |
| I.Q. | Average | 34.92 | 34.44 |
| | High | 40.65 | 42.63 |

## TABLE 96

## ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1967), AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1966), AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1407.04 | 25.17** |
| Method | 1 | 28.30 | .51 |
| I.Q. x M | 2 | 39.14 | .70 |
| Error (within) | 45 | 55.90 | |

**Significant at the .01 level of confidence

## TABLE 97

## TABLE OF MEANS FOR THE T.O. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Group Variables | | T.O. WK N=257 | T.O. WO/K N=206 |
|---|---|---|---|
| | Low | 14.21 | 14.08 |
| I.Q. | Average | 17.32 | 15.85 |
| | High | 19.48 | 18.96 |

## TABLE 98

## ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1967), AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1966), AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 281.74 | 6.20** |
| Method | 1 | 2.60 | .06 |
| I.Q. x M | 2 | 22.31 | .49 |
| Error (within) | 45 | 45.42 | |

**Significant at the .01 level of confidence

## TABLE 99

### TABLE OF MEANS FOR THE T.O. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Group Variables | | T.O. WK N=257 | T.O. WO/K N=206 |
|---|---|---|---|
| | Low | 34.86 | 34.04 |
| I.Q. | Average | 41.53 | 41.00 |
| | High | 46.12 | 46.72 |

## TABLE 100

### ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1967) AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1966) AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1335.56 | 10.92** |
| Method | 1 | 97.86 | .80 |
| I.Q. x M | 2 | 24.33 | .20 |
| Error (within) | 45 | 122.32 | |

**Significant at the .01 level of confidence

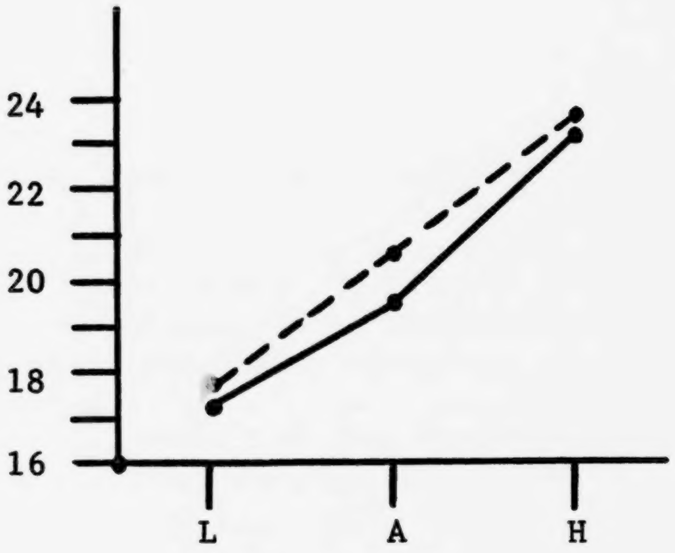

Figure 52

Relationship between Treatment and I.Q. on the Word Meaning Subtest of the Stanford Achievement Test, Primary II, for the T.O. Groups with (1968) and without (1967) Kindergarten Reading Instruction, at the End of Second Grade

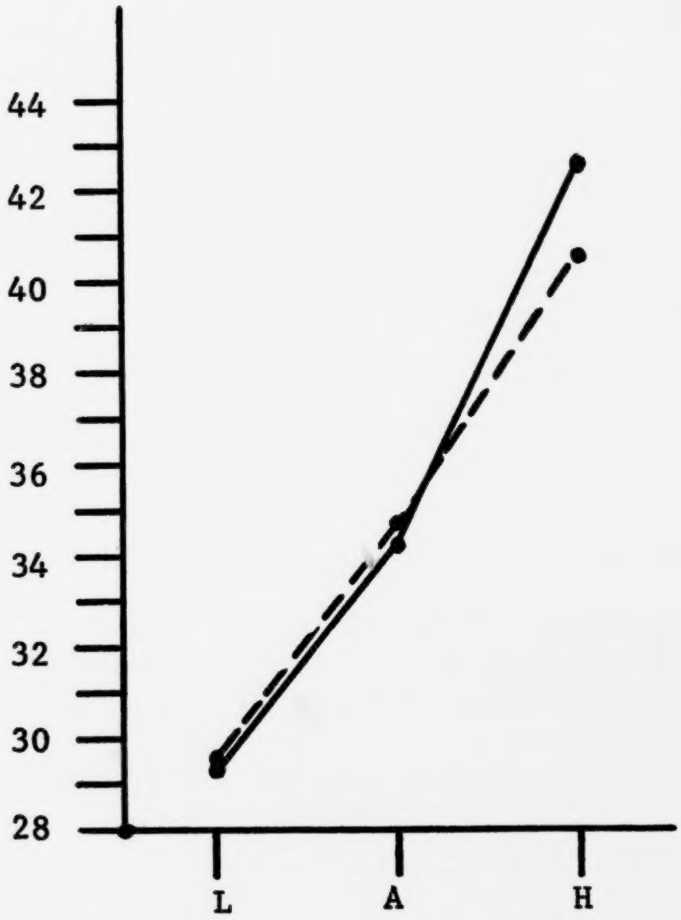

Figure 53

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary II, for the T.O. Groups with (1968) and without (1967) Kindergarten Reading Instruction, at the End of Second Grade

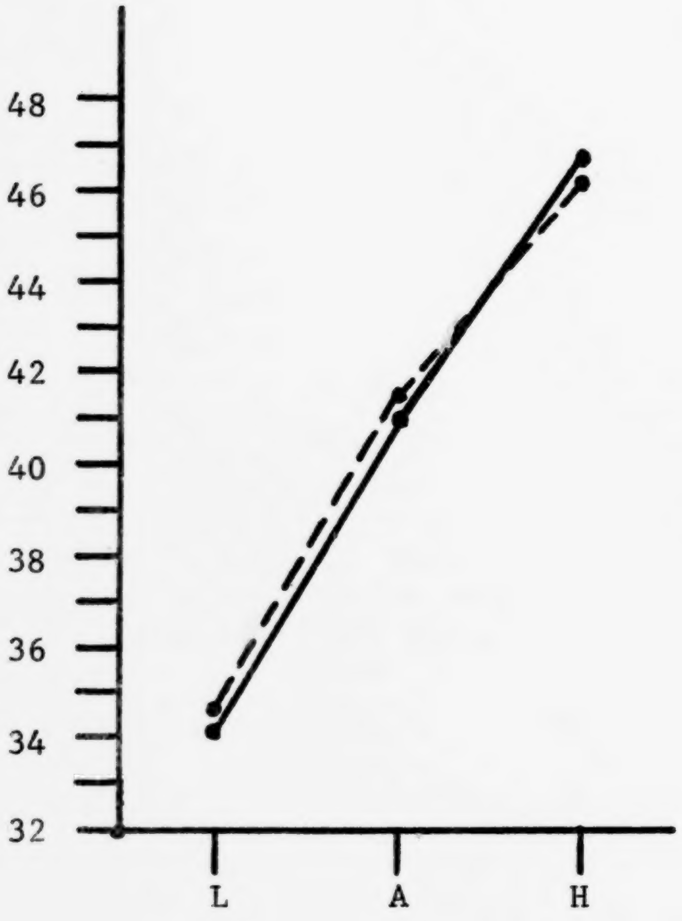

Figure 54

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary II, for the T.O. Groups with (1968) and without (1967) Kindergarten Reading Instruction, at the End of Second Grade

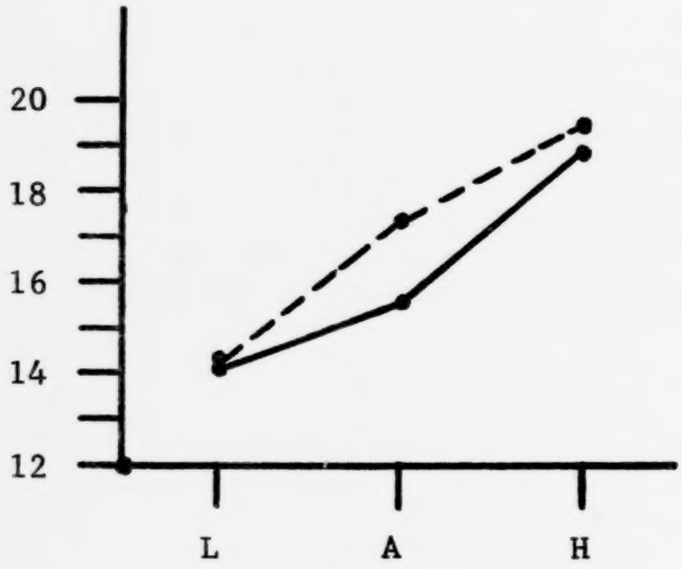

Figure 55

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary II, for the T.O. Groups with (1968) and without (1967) Kindergarten Reading Instruction, at the End of Second Grade

In summary, it would appear that there is no significant advantage to introducing reading at the kindergarten level in traditional orthography; nor does any advantage accrue in reading and spelling achievement for either group, although there certainly may be individual children who profited from the earlier introduction of formal reading.

The fourth hypothesis stated that introducing reading in i.t.a. to kindergarten children would result in significantly better reading and spelling achievement than that attained by children who were formally introduced to reading in first grade in T.O., when both groups are measured at the end of second grade.

An examination of the table of means in Table 101 shows that for the Word Meaning subtest, the i.t.a. group with kindergarten instruction obtained higher means in each of the intelligence categories. The differences in means were 1.54 points in the low-I.Q. category, 2.02 points in the average-I.Q. category, and 1.41 in the high-I.Q. category. The analysis of variance presented in Table 102 shows that the computed F ratio of 7.03 is significant at beyond the .01 level of confidence. Hence, the differences observed in favor of the i.t.a. group with kindergarten instruction could not have resulted from chance factors. There is likewise a significant difference among the intelligence categories as may be observed by the extremely large F ratio of 23.47. Figure 56 shows lines that are relatively parallel in comparing the means by I.Q. category for each of the i.t.a. and T.O. groups. The lack of interaction between I.Q. and method is confirmed by an F ratio of 1.44 which suggests that differences could have resulted from chance factors.

The means for the Paragraph Meaning subtest for the i.t.a. group which began reading instruction at a kindergarten level, and the T.O. group without kindergarten instruction are reported in Table 103. As can be seen, the T.O. group had a slightly higher mean in the high-I.Q. category but lower means in the low and average intelligence categories. The results of the analysis of variance are reported in Table 104. The computed F ratio of .26 is not significant. Hence, the differences observed between treatment groups could have resulted from chance factors. There is, however, a significant difference among the three I.Q. categories as may be seen by the extremely large F ratio for the main effect of intelligence. The obtained F was 45.93 which is significant at well beyond the .01 level. Figure 57 graphically illustrates the means for the two treatment groups and does exhibit some interaction effects. The statistical test for interaction yields an F ratio of 1.21 which is not significant at the .05 level of confidence.

On the Word Study Skills subtest of the Stanford Achievement Test, Primary II, the means for the low-I.Q. group were 37.69 for the i.t.a. group and 34.04 for the T.O. group. For the average intelligence category, the means were 43.85 and 41.00, respectively. For the high-I.Q. category, the means were 48.50 for the i.t.a. group with kindergarten instruction, and 46.72 for the T.O. group without kindergarten instruction. As may be seen, all of these differences favor the i.t.a. group. Table 108 reveals that these differences are not significant as the computed F ratio was 2.39.

## TABLE 101

## TABLE OF MEANS FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Group Variables | | i.t.a. WK N=355 | T.O. WO/K N=206 |
|---|---|---|---|
| | Low | 18.85 | 17.31 |
| I.Q. | Average | 22.58 | 19.56 |
| | High | 24.71 | 23.30 |

## TABLE 102

## ANALYSIS OF VARIANCE FOR THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1967), AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1966), AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 353.78 | 23.47** |
| Method | 1 | 106.04 | 7.03** |
| I.Q. x M | 2 | 21.77 | 1.44 |
| Error (within) | 71 | 15.07 | |

**Significant at the .01 level of confidence

## TABLE 103

### TABLE OF MEANS FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Group Variables | | i.t.a. WK N=355 | T.O. WO/K N=206 |
|---|---|---|---|
| | Low | 30.68 | 29.47 |
| I.Q. | Average | 37.50 | 34.44 |
| | High | 41.96 | 42.63 |

## TABLE 104

### ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1967) AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1966) AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1561.17 | 45.93** |
| Method | 1 | 9.00 | .26 |
| I.Q. x M | 2 | 41.12 | 1.21 |
| Error (within) | 71 | 33.99 | |

**Significant at the .01 level of confidence

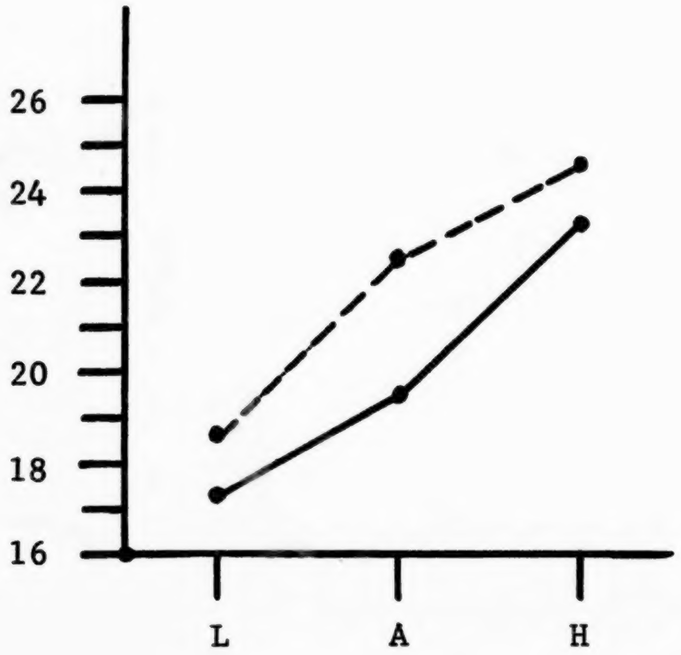

Figure 56

Relationship between Treatment and I.Q. on the Word Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Group with Kindergarten Reading Instruction, and the T.O. Group without Kindergarten Reading Instruction, at the End of Second Grade

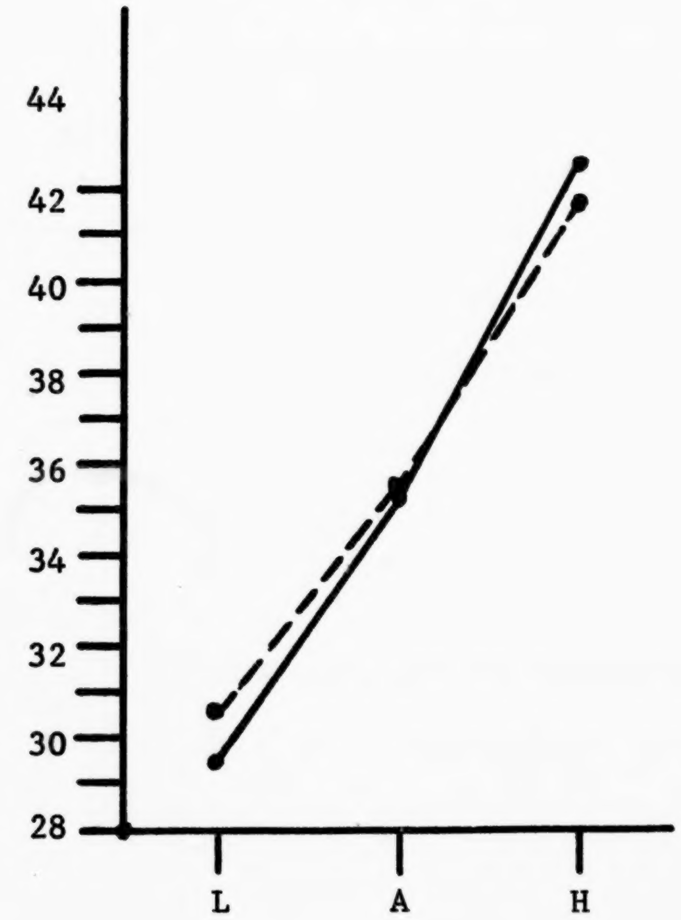

Figure 57

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Group with Kindergarten Reading Instruction, and the T.O. Group without Kindergarten Reading Instruction, at the End of Second Grade

Again, a significant difference is observed for the main effect of intelligence as indicated by the significant F ratio of 41.26. Figure 58 visually illustrates the means by I.Q. category for each of the two treatment groups. The lack of interaction is confirmed by the non-significant F ratio of .14.

On the Spelling subtest of the Stanford, the means of the i.t.a. group with kindergarten experience were higher than the means of the T.O. group without kindergarten instruction for each I.Q. category. Table 105 presents the results for the Spelling subtest. The obtained F ratio of .35 is not significant at the .05 level of confidence, which suggests the differences observed in favor of the i.t.a. group are likely due to chance factors rather than the medium of instruction. The F ratio for intelligence was significant at beyond the .01 level of confidence which suggests that there are significant differences in the I.Q.'s of the three intelligence categories. Figure 59 illustrates these mean differences between the two treatment groups. As can be seen in Table 106 there is no significant interaction between intelligence and method. The obtained F ratio of .48 is not significant.

In summary, the i.t.a. group with kindergarten instruction was significantly better in only one area, that being Word Meaning. No significant differences were observed in comprehension, as measured by Paragraph Meaning, Word Study Skills, and Spelling.

The fifth hypothesis predicted that introducing i.t.a. to first-grade children would result in significantly better reading and spelling achievement than that attained by children who begin formal reading in

TABLE 105

TABLE OF MEANS FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Group Variables | | i.t.a. WK N=355 | T.O. WO/K N=206 |
|---|---|---|---|
| | Low | 15.58 | 14.08 |
| I.Q. | Average | 17.51 | 15.85 |
| | High | 19.79 | 18.96 |

TABLE 106

ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1967), AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1966) AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 209.13 | 14.20** |
| Method | 1 | 5.21 | .35 |
| I.Q. x M | 2 | 7.10 | .48 |
| Error (within) | 71 | 14.73 | |

**Significant at the .01 level of confidence

## TABLE 107

### TABLE OF MEANS FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Group Variables | | i.t.a. WK N=355 | T.O. WO/K N=206 |
|---|---|---|---|
| | Low | 37.69 | 34.04 |
| I.Q. | Average | 43.85 | 41.00 |
| | High | 48.50 | 46.72 |

## TABLE 108

### ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1967) AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1966) AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1568.13 | 41.26** |
| Method | 1 | 90.84 | 2.39 |
| I.Q. x M | 2 | 5.43 | .14 |
| Error (within) | 71 | 38.00 | |

**Significant at the .01 level of confidence

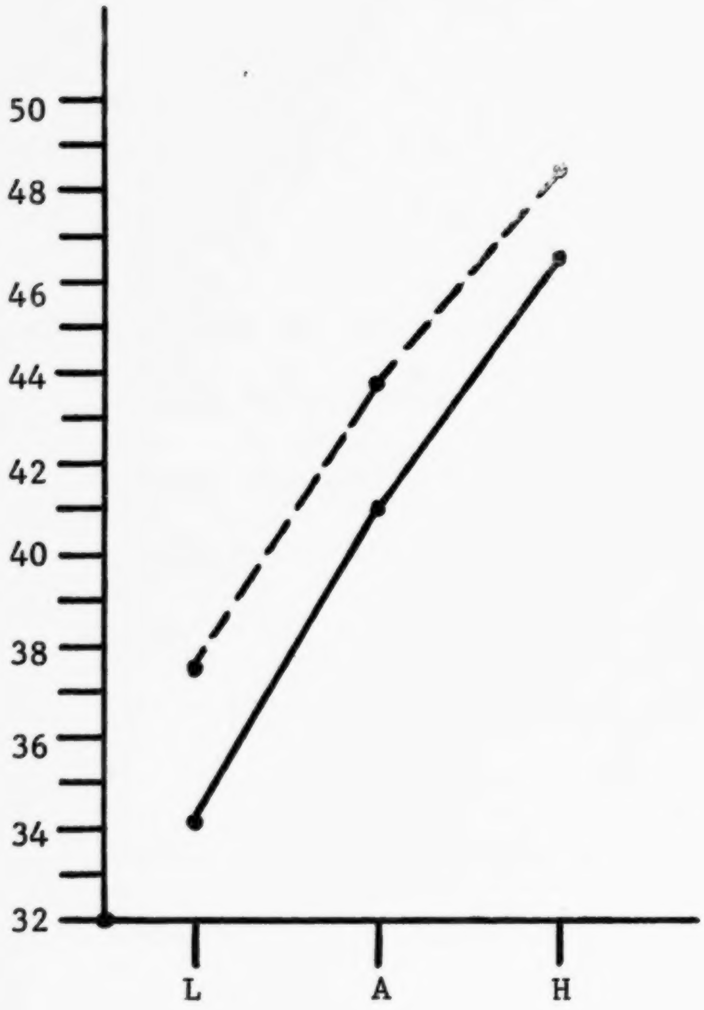

Figure 58

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Group with Kindergarten Reading Instruction, and the T.O. Group without Kindergarten Reading Instruction, at the End of Second Grade

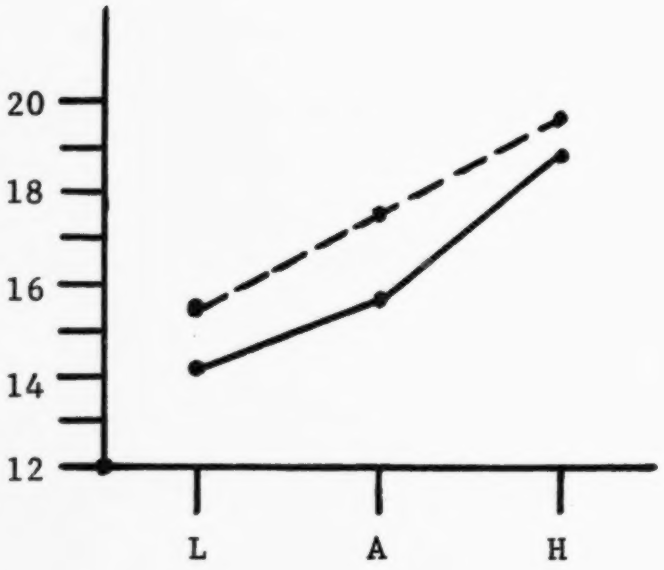

Figure 59

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Group with Kindergarten Reading Instruction, and the T.O. Group without Kindergarten Reading Instruction at the End of Second Grade kindergarten in T.O. when both groups are measured at the end of second grade.

On the Word Meaning subtest, an inspection of the table of means shows a slightly superior performance for the i.t.a. group without kindergarten reading experience over the T.O. group with kindergarten reading experience for each category of intelligence. As revealed in Table 110 the analysis of variance computed for these means yielded an F ratio of 3.88, which was not significant at the .05 level of confidence. The F ratio required for significance for 1 and 46 degrees of freedom on this subtest was 4.05. There is a significant difference at well beyond the .01 level of confidence for intelligence, which indicates that differences among the three I.Q. categories are highly significant. Figure 60 graphically shows the comparison of means for each of the two treatment groups for each category of intelligence. The lack of interaction is verified statistically as the F ratio for the interaction between intelligence and medium of instruction was .09, which is not significant.

On the Paragraph Meaning subtest, the means for the i.t.a. group without kindergarten reading instruction were again slightly higher for each category of intelligence. However, as shown in Table 112, these differences are not significant as the computed F ratio was 1.82. As also revealed in Table 111, the main effect of intelligence is shown by the significant F ratio. The differences among I.Q. categories were significant at beyond the .01 level of confidence. Figure 61 presents a visual representation of the means by I.Q. categories for each of the two treatments. The lines are relatively parallel and no significant interaction is observed. The computed

F ratio for interaction of .15 was not significant.

On the Word Study Skills subtest, the means for the low-I.Q. group were 37.76 for the i.t.a. group without kindergarten instruction, and 34.86 for the T.O. group with kindergarten instruction. For the average I.Q. category, the means were 45.56 and 41.53, for the i.t.a. and T.O. groups, respectively. For the high intelligence category, the means were 48.65 and 46.12 for the i.t.a. group without kindergarten and for the T.O. group with kindergarten, respectively. The performance for the i.t.a. group was higher for each category of intelligence: slightly less than 3 points for the low-I.Q. category, approximately 4 points for the average-I.Q. category, and about 2-1/2 points in the high-intelligence category. Table 113 reports the results from the Word Study Skills subtest. The obtained F ratio of 7.15 is significant at the .05 level of confidence for 1 and 46 degrees of freedom. The F ratio computed for intelligence was likewise significant at beyond the .01 level of confidence which indicates significant differences among the three intelligence categories. Figure 62 illustrates these mean differences between the two treatment groups. No significant interaction between medium of instruction and intelligence was observed as revealed by an F ratio of .02, which is not significant. Thus these differences are likely due to chance factors.

On the Spelling subtest, the mean differences in spelling achievement for each of the intelligence categories were very small, with all differences being in favor of the i.t.a. group without kindergarten reading instruction. As revealed in Table 116, the F ratio of .47 is not significant.

## TABLE 109

### TABLE OF MEANS FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION ON THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Group Variables | | i.t.a. WO/K N=260 | T.O. WK N=257 |
|---|---|---|---|
| | Low | 19.51 | 17.89 |
| I.Q. | Average | 23.29 | 20.69 |
| | High | 24.83 | 23.65 |

## TABLE 110

### ANALYSIS OF VARIANCE FOR THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1966) AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1967), AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 270.17 | 8.07** |
| Method | 1 | 129.86 | 3.88* |
| I.Q. x M | 2 | 3.13 | .09 |
| Error (within) | 46 | 33.46 | |

*Significant at the .05 level of confidence
**Significant at the .01 level of confidence

## TABLE 111

## TABLE OF MEANS FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Group Variables | | i.t.a. WO/K N=260 | T.O. WK N=257 |
|---|---|---|---|
| | Low | 30.81 | 29.57 |
| I.Q. | Average | 40.35 | 34.92 |
| | High | 42.25 | 40.65 |

## TABLE 112

## ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1966), AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1967), AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1372.74 | 18.96** |
| Method | 1 | 131.73 | 1.82 |
| I.Q. x M | 2 | 11.01 | .15 |
| Error (within) | 46 | 72.39 | |

**Significant at the .01 level of confidence

## TABLE 113

## TABLE OF MEANS FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Group Variables | | i.t.a. WO/K N=260 | T.O. WK N=257 |
|---|---|---|---|
| | Low | 37.76 | 34.86 |
| I.Q. | Average | 45.56 | 41.53 |
| | High | 48.65 | 46.12 |

## TABLE 114

## ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1966), AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1967), AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1389.61 | 12.87** |
| Method | 1 | 771.77 | 7.15* |
| I.Q. x M | 2 | 2.36 | .02 |
| Error (within) | 46 | 108.00 | |

*Significant at the .05 level of confidence
**Significant at the .01 level of confidence

## TABLE 115

## TABLE OF MEANS FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Group Variables | | i.t.a. WO/K<br>N=260 | T.O. WK<br>N=257 |
|---|---|---|---|
| | Low | 14.96 | 14.21 |
| I.Q. | Average | 18.93 | 17.32 |
| | High | 20.95 | 19.48 |

## TABLE 116

## ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1966), AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1967), AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 286.48 | 5.67** |
| Method | 1 | 23.71 | .47 |
| I.Q. x M | 2 | .80 | .02 |
| Error (within) | 46 | 50.54 | |

**Significant at the .01 level of confidence

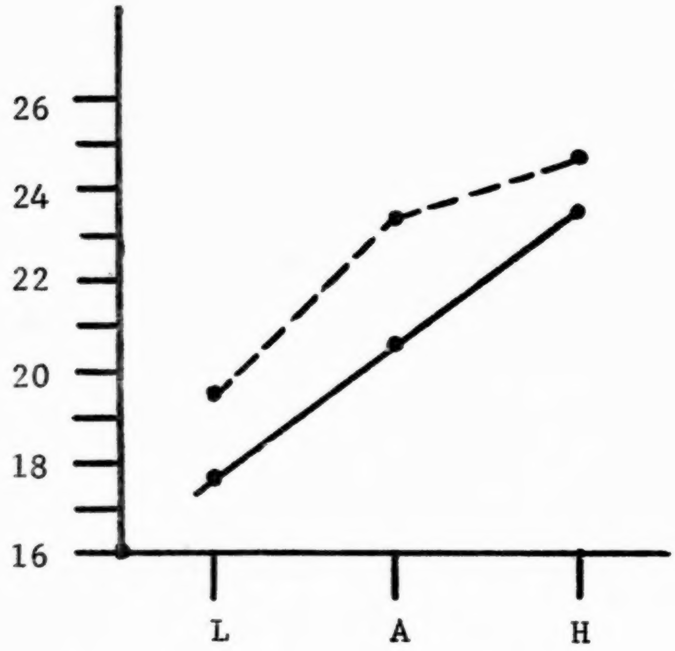

Figure 60

Relationship between Treatment and I.Q. on the Word Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Group without Kindergarten Reading Instruction, and the T.O. Group, with Kindergarten Reading Instruction, at the End of Second Grade

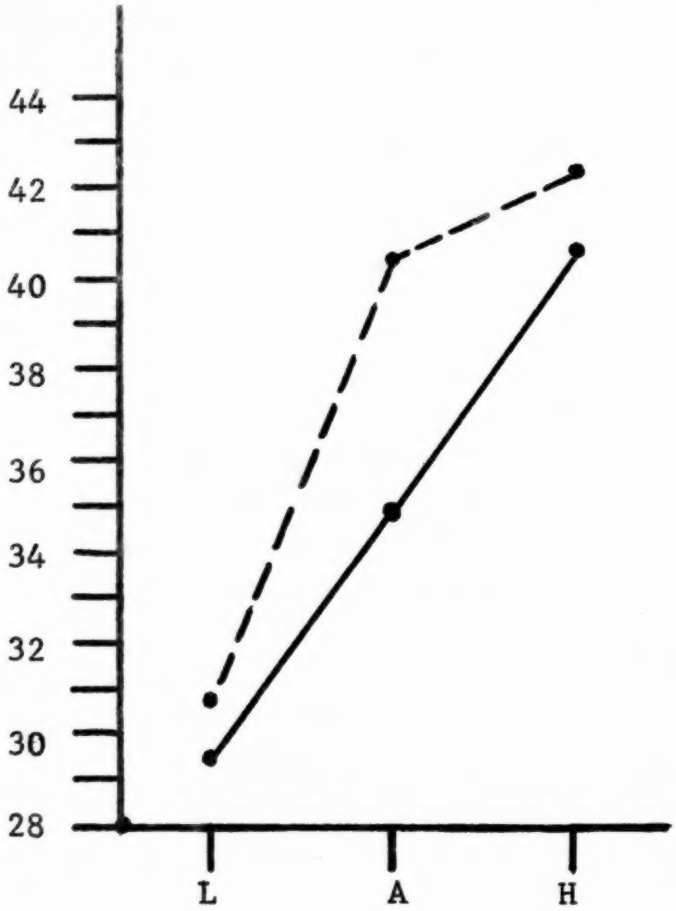

Figure 61

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Group without Kindergarten Reading Instruction, and the T.O. Group with Kindergarten Reading Instruction, at the End of Second Grade

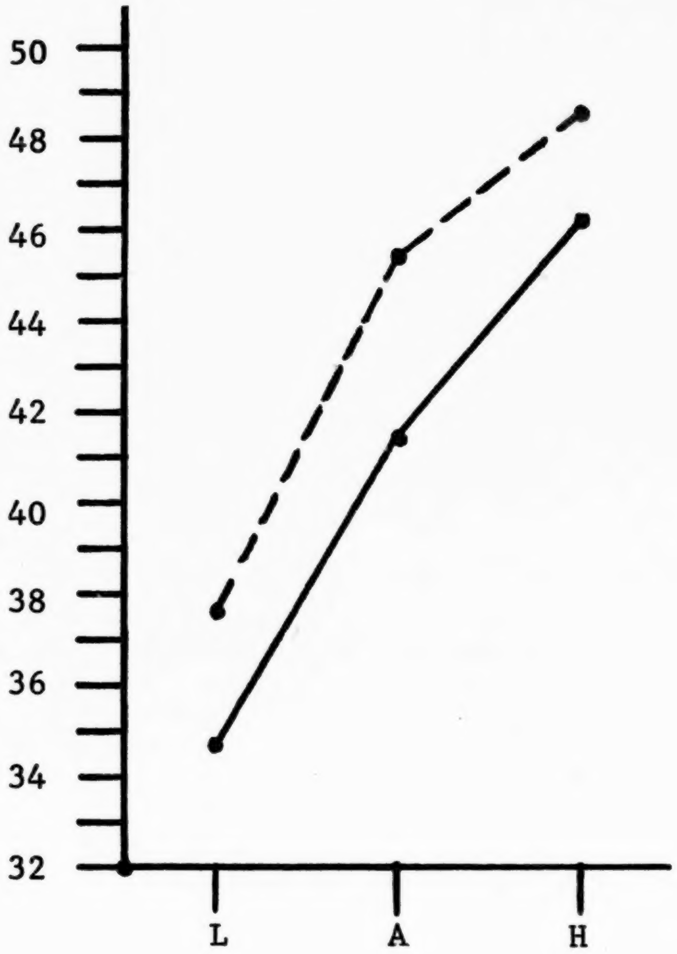

Figure 62

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Group without Kindergarten Reading Instruction, and the T.O. Group with Kindergarten Reading Instruction, at the End of Second Grade

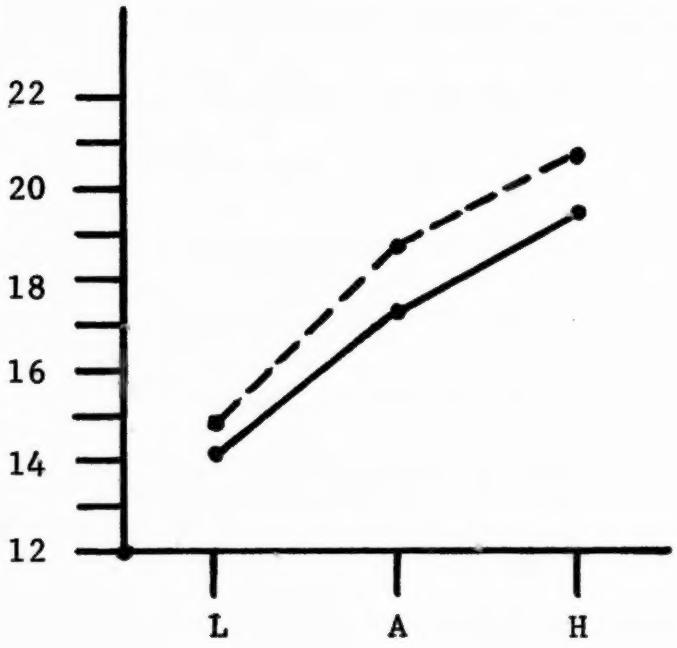

Figure 63

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Group without Kindergarten Reading Instruction, and the T.O. Group with Kindergarten Reading Instruction, at the End of Second Grade

There is a significant difference at well beyond the .01 level of confidence for intelligence. An inspection of Figure 63 visually shows the comparison of means for each of the two treatments for each category of intelligence. As can be noted, the means for the i.t.a. group are slightly higher than the T.O. group for each I.Q. category. There is no significant interaction between intelligence and medium of instruction as confirmed by the F ratio of .02, which for 2 and 46 degrees of freedom is not significant.

Summarizing the preceding results, it would appear that the i.t.a. group without kindergarten reading instruction was significantly better in Word Study Skills than the group that was initially taught in T.O. at the kindergarten level when both groups were measured at the end of second grade. No significant differences were observed in word recognition as measured by the Word Meaning subtest, and in comprehension, as measured by the Paragraph Meaning subtest. In the area of spelling no significant difference was observed in the performance of those children who were instructed in i.t.a. and those children instructed in T.O., despite the fact that the T.O. children began reading instruction at an earlier time than the i.t.a. group. This result differs from that observed at the end of the first grade where children instructed in i.t.a. were significantly poorer in spelling ability than the group who began their reading instruction in T.O. at a kindergarten level.

Hypothesis six stated that introducing reading instruction to first-grade children in i.t.a. would result in significantly better reading and spelling achievement than that attained by children who begin reading instruction in first grade in traditional orthography, when both groups are measured at the end of third grade. This hypothesis is reported under Hypothesis 2, in the section: End-of-Year Results: Fourth-Year Analysis of Variance.

The conclusions statistically derived on the basis of the third year of the study are as follows:

1. When reading is introduced on a formal basis at the kindergarten level, utilizing a consistent medium such as i.t.a., significantly better reading achievement does not result at the end of second grade than when traditional orthography is utilized as the medium of instruction. No significant differences are noted on any of the three reading subtests of the Stanford Achievement Primary II, nor was there any significant difference in spelling. It should be noted, however, that the mean achievement for the i.t.a.-instructed children was higher for each category of intelligence on each of the reading and Spelling subtests of the Stanford Achievement Test. Although these higher means are the result of chance variations, it is significant to note that there is no case where the T.O. group exhibited a higher mean reading achievement score.

2. When i.t.a. is utilized as the medium of instruction, children who are introduced to reading at a kindergarten level do not perform significantly better in reading and spelling than those children who are introduced to reading in i.t.a. at a first-grade level when both groups are measured at the end of Grade 2.

3. Introducing reading on a formal basis at the kindergarten level

in traditional orthography does not result in significantly higher achievement on any subtest of the Stanford Achievement Test than results from introducing reading in traditional orthography at the first-grade level when both groups are measured at the end of second grade. Therefore, it would not appear advisable to introduce reading at a kindergarten level on a general basis to all children, although there certainly may be individual children who benefited from early instruction in reading.

4. When i.t.a. is utilized as the medium of instruction, children who are introduced to reading at a kindergarten level do not perform significantly better in word analysis, comprehension and spelling achievement than those children who begin formal reading in first grade in T.O. when both groups are measured at the end of second grade. Those children introduced to reading at a first-grade level in i.t.a. do perform significantly better in word recognition, as measured by the Word Meaning subtest. The results of the Spelling subtest differ from that observed at the end of first grade when a significant difference in spelling achievement was found in favor of the T.O.-instructed group. The results at the end of second grade strongly suggest that after all children who were initially instructed in i.t.a. in kindergarten have made the transition to traditional orthography, their spelling achievement is equal to the performance of the group that was initially instructed in T.O. in first grade. It should be noted that the mean achievement of the i.t.a.-instructed children was higher for each category of intelligence on each of the subtests of the Stanford Achievement Test, although the only significant difference was observed on the Word

Meaning subtest.

5. Children taught to read using the i.t.a. medium at a first-grade level performed significantly better in Word Study Skills than children who began reading instruction at the kindergarten level in traditional orthography when both groups were measured at the end of second grade. No significant differences were observed in Paragraph Meaning or Spelling. In Word Meaning as well, no significant difference was observed, although the difference was almost significant at the .05 level.

6. When reading instruction is introduced on a formal basis at a first-grade level, and the children's achievement is measured at the end of third grade, those children instructed in the i.t.a. medium were significantly better in Word Study Skills than were their T.O. counterparts. The difference on the Word Meaning subtest of the Stanford Achievement Test was almost significant at the .05 level. No differences were observed in Paragraph Meaning or Spelling. This confirms previous results suggesting that i.t.a.-instructed children are generally better in word recognition skills than are children instructed in T.O.

No significant interactions resulted in the measurement of any of the hypotheses between the medium of instruction and intelligence. This means that in any of the comparisons, when one of the treatment groups performed at a significantly better level, children of low, average, and high intelligence performed better than children in the other treatment group for each category of intelligence. Hence, it would not appear that a decision as to medium of instruction in beginning reading, for any child, should be based upon the child's intellectual level. If one medium is better than another, it will be better regardless of the child's intellectual ability and if it is worse, it would be worse for all children of equal intellectual ability.

The primary purpose of this study is to determine the longitudinal effects at the end of third grade to determine whether the effects of early reading instruction, which were not statistically evident at the end of second grade, become significant at the end of third grade. It can be noted in the conclusion reported above that although beginning instruction in i.t.a. at the kindergarten level did not seem to be more effective statistically than beginning reading instruction in traditional orthography, in all cases the means of the i.t.a. group were higher for each of the reading subtests used to evaluate progress--although all of these differences could certainly have been the result of chance.

## End-of-Year Results: Fourth-Year Analysis of Variance

The first hypothesis tested was the effect of introducing a consistent medium such as i.t.a. to kindergarten children in a formal reading program as compared to the introduction of formal reading to children who learned in traditional orthography in kindergarten, when both groups are measured at the end of third grade on reading and spelling achievement. To test this hypothesis an analysis of variance was computed using a 3 x 2 design. The i.t.a. and T.O. groups were combined and a frequency distribution was prepared utilizing the scores obtained on the Pintner-Durost intelligence test given in third grade. On the basis of the frequency distribution of the combined i.t.a. and T.O. groups the total sample was divided into three equal categories of intelligence which have been labeled low, average, and high. The mean on each of the subtests of the reading scores were computed for the i.t.a. children in the low intelligence group and the T.O. children in the low intelligence group and similar computations were done for the group of average intelligence and the group categorized as being of high intelligence. The table of means for the i.t.a. and T.O. children for each of the subtests of the Stanford Achievement Test Primary II may be seen in Table 117. A table of means was also prepared on each of the Stanford Achievement Test subtests for those i.t.a. children and those T.O. children who had not begun reading instruction at the kindergarten level and who completed third grade in 1967. This table of means is also included in the same table. The subtest utilized for the analysis of variance on the Stanford Achievement Test Primary II are Word Meaning, Paragraph Meaning, Word Study Skills and Spelling. Tables 119, 121, 123 and 125 present the analyses of variance for each of the subtests of the Stanford Achievement Test Primary II, comparing i.t.a. and T.O. children who began reading instruction at the kindergarten level when tested on the Word Meaning subtest of the Stanford Achievement Test at the end of third grade. As may be observed in the table of means, the average scores obtained by the i.t.a.-instructed kindergarten group was slightly higher than the means obtained for the T.O.-instructed kindergarten group for each of the three categories of intelligence. The computed analysis of variance as can be

## TABLE 117

## TABLE OF MEANS FOR i.t.a. AND T.O. GROUPS AT THE END OF THIRD GRADE ON THE (1) WORD MEANING, (2) PARAGRAPH MEANING, (3) SPELLING, (4) WORD STUDY SKILLS SUBTESTS OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II

| | | End of Third Grade 1966-67 | | | | End of Third Grade 1967-68 | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | i.t.a. WO/K* | | T.O. WO/K | | i.t.a. W/K** | | T.O. W/K | |
| | I.Q. | N | | N | | N | | N | |
| (1) | Low | 73 | 24.52 | 81 | 23.86 | 89 | 24.64 | 80 | 23.21 |
| | Av. | 89 | 27.76 | 55 | 26.75 | 117 | 27.67 | 62 | 26.53 |
| | High | 91 | 30.22 | 70 | 29.87 | 91 | 30.12 | 64 | 28.75 |
| (2) | Low | | 37.81 | | 38.89 | | 40.40 | | 38.61 |
| | Av. | | 44.81 | | 43.25 | | 44.97 | | 44.40 |
| | High | | 49.28 | | 49.44 | | 50.33 | | 49.03 |
| (3) | Low | | 20.71 | | 22.02 | | 22.35 | | 20.43 |
| | Av. | | 24.49 | | 22.60 | | 23.33 | | 21.76 |
| | High | | 26.08 | | 25.19 | | 25.41 | | 24.47 |
| (4) | Low | | 45.18 | | 43.85 | | 45.88 | | 42.59 |
| | Av. | | 52.01 | | 48.13 | | 51.91 | | 49.95 |
| | High | | 56.34 | | 52.89 | | 56.21 | | 51.70 |

*Without Kindergarten Reading Instruction
**With Kindergarten Reading Instruction

## TABLE 118

## TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION ON THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | i.t.a. WK<br>N=297 | T.O. WK<br>N=206 |
|---|---|---|---|
| | Low | 24.64 | 23.21 |
| I.Q. | Average | 27.67 | 26.53 |
| | High | 30.12 | 28.75 |

## TABLE 119

## ANALYSIS OF VARIANCE FOR THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION AT THE END OF THIRD GRADE, 1968

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1286.57 | 61.80** |
| Method | 1 | 206.70 | 9.93** |
| I.Q. x M | 2 | .99 | .05 |
| Error (within) | 497 | 20.82 | |

**Significant at the .01 level of confidence

## TABLE 120

### TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | i.t.a. WK N=297 | T.O. WK N=206 |
|---|---|---|---|
| | Low | 40.40 | 38.61 |
| I.Q. | Average | 44.97 | 44.40 |
| | High | 50.33 | 49.03 |

## TABLE 121

### ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION AT THE END OF THIRD GRADE, 1968

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 4242.61 | 69.39** |
| Method | 1 | 180.78 | 2.96 |
| I.Q. x M | 2 | 15.54 | .25 |
| Error | 497 | 61.14 | |

**Significant at the .01 level of confidence

## TABLE 122

## TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | i.t.a. WK N=297 | T.O. WK N=206 |
|---|---|---|---|
| | Low | 22.35 | 20.43 |
| I.Q. | Average | 23.33 | 21.76 |
| | High | 25.41 | 24.47 |

## TABLE 123

## ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION AT THE END OF THIRD GRADE, 1968

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 526.14 | 15.48** |
| Method | 1 | 269.80 | 7.94** |
| I.Q. x M | 2 | 9.83 | .29 |
| Error | 497 | 33.99 | |

**Significant at the .01 level of confidence

## TABLE 124

## TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITH KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | i.t.a. WK N=297 | T.O. WK N=206 |
|---|---|---|---|
| | Low | 45.88 | 42.59 |
| I.Q. | Average | 51.91 | 49.95 |
| | High | 56.21 | 51.70 |

## TABLE 125

## ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION AT THE END OF THIRD GRADE, 1968

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 4322.90 | 50.61** |
| Method | 1 | 1246.08 | 14.59** |
| I.Q. x M | 2 | 63.61 | .74 |
| Error | 497 | 85.42 | |

**Significant at the .01 level of confidence

seen in Table 119 yields an F ratio of 9.93 which for 1 and 497 degrees of freedom is significant at beyond the .01 level of confidence. This indicates that the i.t.a.-instructed children were significantly better in Word Meaning than were the T.O.-instructed children when measured at the end of third grade. The main effect of intelligence may also be observed in the table as significant at well beyond the .01 level of confidence which suggests that there is a significant difference among the three intelligence categories. This is not surprising as the structure of the three groups by intelligence was pre-arranged. The F ratio obtained for intelligence by method is .05, which is not significant. Hence, it would appear that no interaction exists between intelligence and the medium of instruction employed. We may thus conclude that regardless of the intelligence category, i.t.a.-instructed children scored significantly higher in Word Meaning than T.O.-instructed children when both groups begin instruction at the kindergarten level. The lack of interaction may be graphically observed in Figure 64 where the lines are relatively parallel and the i.t.a. group has slightly higher means for each of the intelligence categories.

Table 121 reports the results of the i.t.a. and T.O. treatment groups who had begun reading instruction at the kindergarten level on the Paragraph Meaning subtest of the Stanford Achievement Test Primary II. For this subtest, a table of means reveals scores of 40.4, 45, and 50, for the low, average, and high I.Q. groups respectively, who had been instructed in i.t.a., and scores of 38.6, 44, and 49, for the T.O. groups, respectively. The computed analysis of variance yields an F ratio of 2.96 which for 1 and

497 degrees of freedom is not significant. It is possible that the differences observed are due to chance variation, rather than the difference of the medium of instruction. An F ratio of approximately 3.8 is required for significance so it may be seen that the F ratio approaches significance at the .05 level but is still not sufficient to reject the null hypothesis since the difference observed between the means is zero. Again, the highly significant F ratio for intelligence suggests that there is a very significant difference between the categories of intelligence. The F ratio of .25 computed for intelligence by method reveals that no significant interaction exists between intelligence and treatment. This may also be observed graphically in Figure 65 where the lines again are relatively parallel, with the i.t.a. group slightly higher than the T.O. group.

The results of the analysis of the Word Study Skills subtest are presented in Table 125. The mean scores for the i.t.a. group in each of the categories of intelligence is higher than that obtained for the T.O. group. As may be observed in the table, the F ratio of 14.59 is significant at well beyond the .01 level of confidence for 1 and 497 degrees of freedom. This suggests that observed differences are likely not due to chance factors. Because of the procedure utilized in dividing the three groups by intelligence, the F ratio for intelligence is significant at well beyond the .01 level of confidence which would be expected. Again, an examination of the interaction of intelligence and medium of instruction yields an F ratio of .74, which is not significant. Figure 66 graphically illustrates the superiority of the i.t.a. group for each of the intelligence categories and

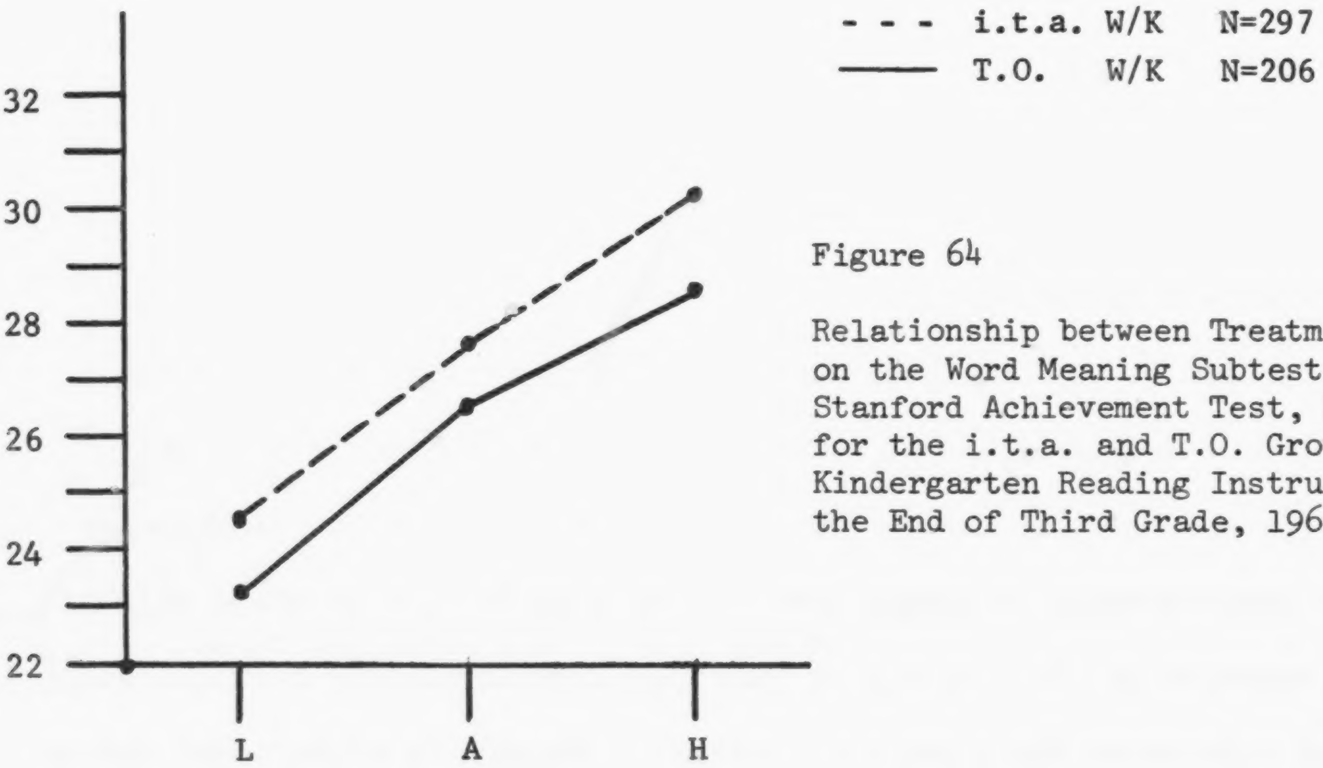

Figure 64

Relationship between Treatment and I.Q. on the Word Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. Groups with Kindergarten Reading Instruction, at the End of Third Grade, 1968

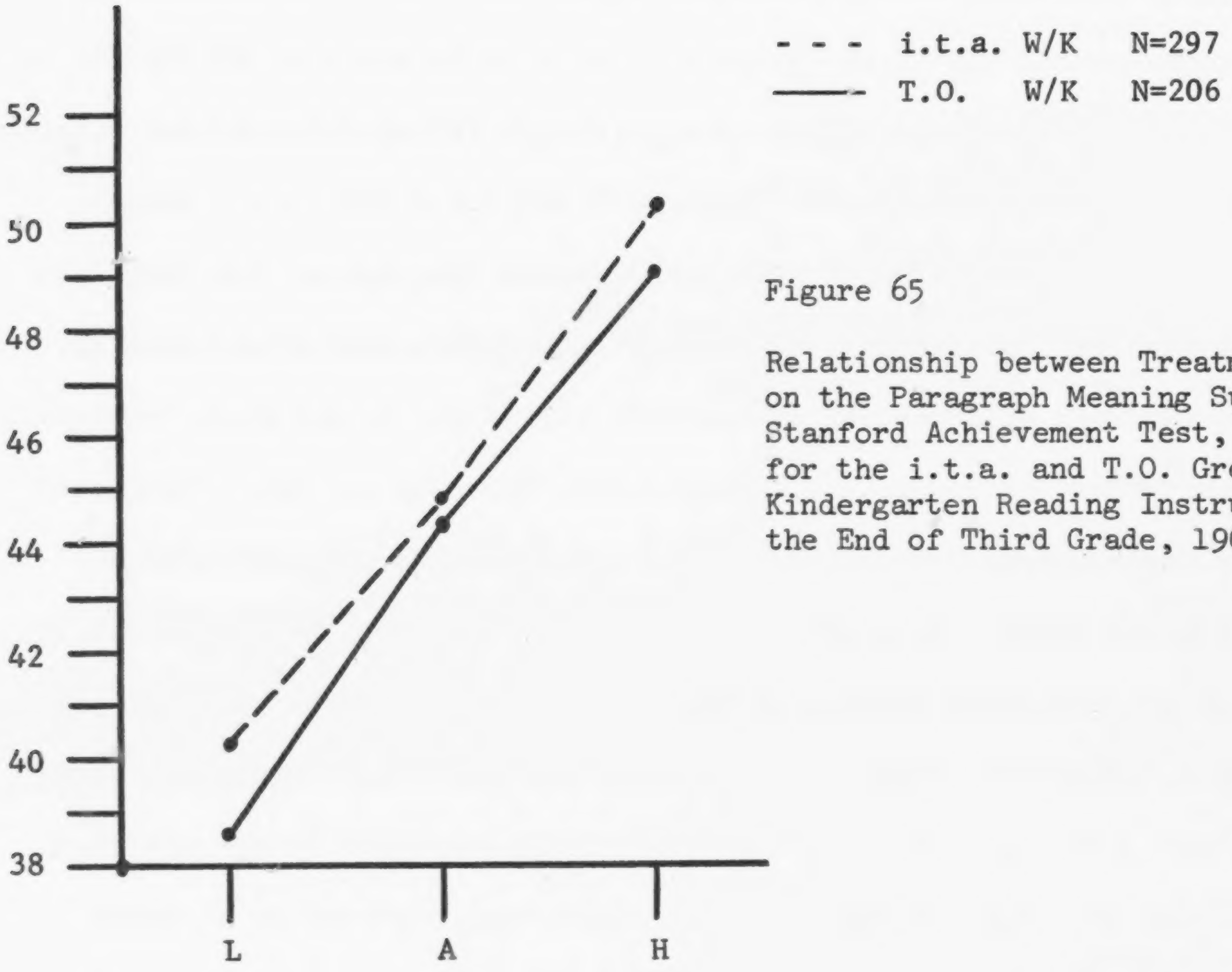

Figure 65

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. Groups with Kindergarten Reading Instruction, at the End of Third Grade, 1968 confirms the lack of interaction seen statistically.

The results for the Spelling subtest on the Stanford Achievement Test Primary II are presented in Table 123. An examination of the table of means reveals that the i.t.a. group was superior to the T.O.-instructed group for each category of intelligence. The significance of these differences as computed by the analysis of variance is indicated by the obtained F ratio of 7.94 which for 1 and 497 degrees of freedom is significant beyond the .01 level of confidence. Hence, it would appear that the spelling ability of the i.t.a.-instructed children was significantly better at the end of third grade than that of the T.O.-instructed children. The differences in intelligence among the three categories was significant and, as may be observed, the F ratio of .29 yields no significant interaction between intelligence and medium of instruction. Figure 67 indicates the i.t.a. group slightly superior in each category of intelligence and, again, the lines are relatively parallel, confirming the lack of interaction seen statistically.

In summary, when reading instruction begins at the kindergarten level, children instructed in i.t.a. are significantly superior to those instructed in T.O. in Word Meaning, Word Study Skills and Spelling, when measured at the end of third grade. No significant difference between the two groups is observed on the Paragraph Meaning subtest which measures comprehension. It would appear, therefore, that i.t.a. produces better word recognition, word analysis, and spelling, than does T.O. instruction, but the slight differences in favor of i.t.a. in comprehension could have occurred as a result of chance.

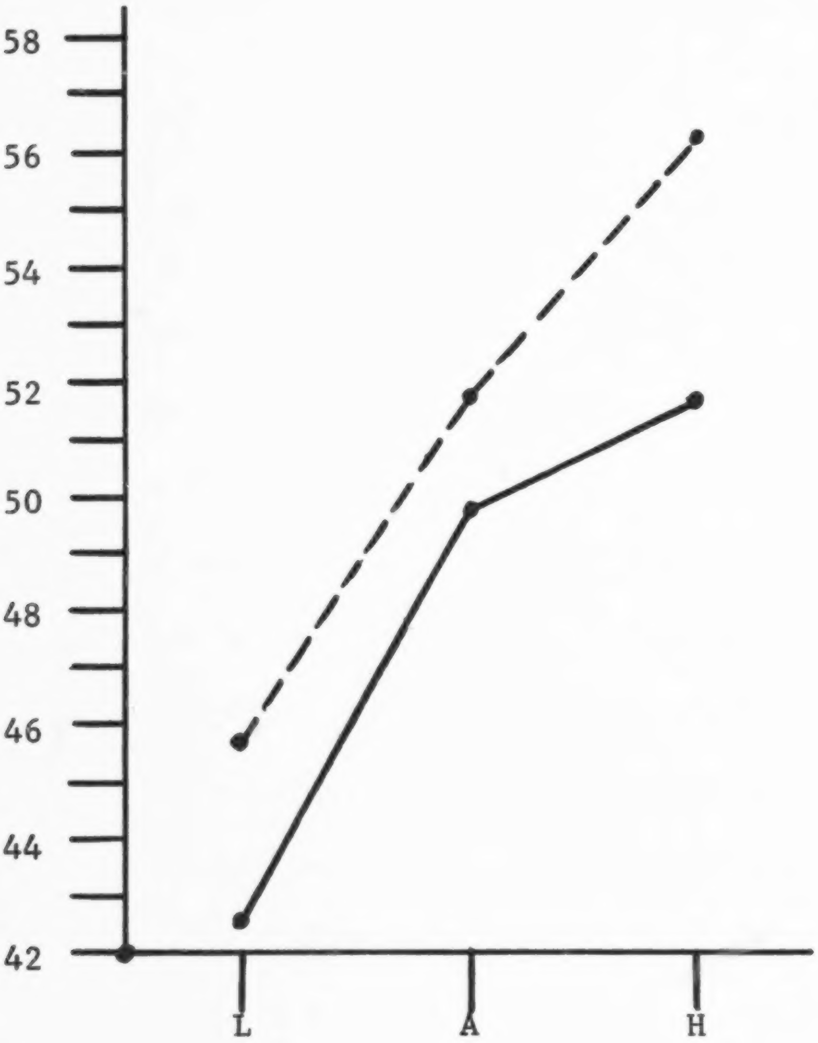

Figure 66

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. Groups with Kindergarten Reading Instruction, at the End of Third Grade, 1968

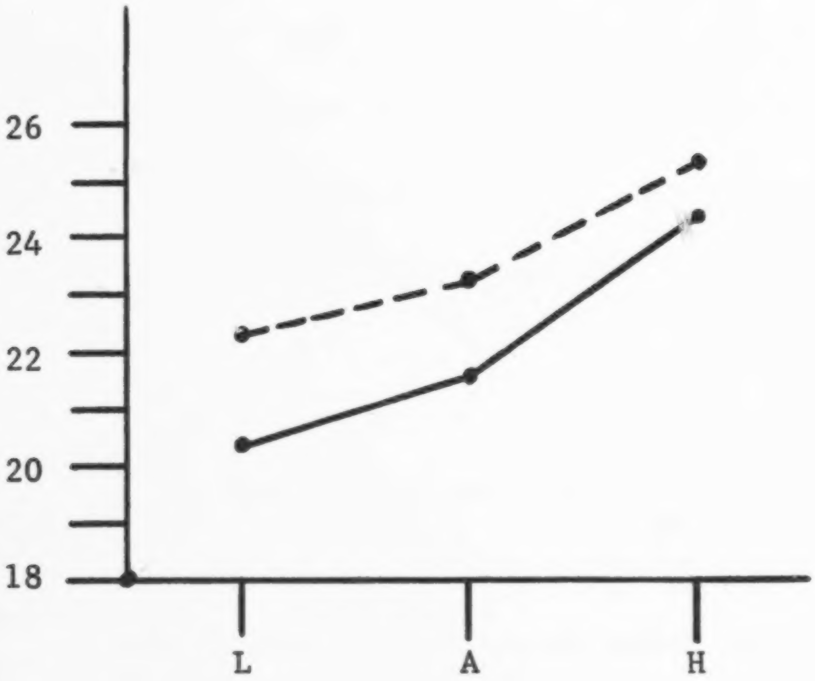

Figure 67

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. Groups with Kindergarten Reading Instruction, at the End of Third Grade, 1968

Hypothesis 2 states that beginning reading instruction at a first-grade level in i.t.a. will not result in significantly better reading and spelling ability than beginning reading instruction in traditional orthography, when both groups are measured at the end of third grade. Table 127 provides the results of the analysis of variance for the Word Meaning subtest of the Stanford Achievement Test Primary II for the i.t.a.- and T.O.-instructed children who began reading instruction at a first-grade level. As may be observed in the table, the resulting F ratio of 2.74 is not significant, which suggests that the slightly higher means obtained for the i.t.a. children for each of the categories of intelligence could have been the result of chance. A significant F ratio is observed for intelligence, at well beyond the .01 level of confidence, which suggests that there is a significant difference among the categories of intelligence. The interaction is not significant between intelligence and medium of instruction as may be observed in the resulting F ratio of .23. This confirms the relative parallelism that can be observed between the i.t.a. and T.O. groups by category of intelligence in Figure 68.

The results for the Paragraph Meaning subtest are contained in Table 129. Again, we have a significant F ratio for the main effect of intelligence which again suggests that the intelligence groups are significantly different from one another, but there is no significant difference for medium of instruction, as may be observed by the .003 F ratio. The obtained F ratio for interaction of 1.01 is likewise not significant. Hence, it would appear that the differences between the means of the i.t.a.

and T.O. group are the result of chance variation. For the low I.Q. group, the mean of the T.O.-instructed group is slightly higher. For the average group, the mean of the T.O. group is slightly higher, and for the high intelligence group, the mean of the T.O. group is very slightly higher. Figure 69 shows the two lines as practically coinciding. These minor variations are certainly not significant as the extremely small F ratio suggests. The interaction is likewise well below the level required for significance.

On the Word Study Skills subtest, for which results are contained in Table 131, there is a statistically significant difference between the i.t.a. and T.O. groups in performance. The mean of the i.t.a. group is higher than that of the T.O. group for each of the categories of intelligence, and the resulting F ratio of 11.54 suggests that these differences are significant at beyond the .01 level of confidence. There is a significant difference also for the main effect of intelligence, which is not surprising, since the groups were divided by intelligence and this suggests that the differences between each of the intelligence categories are significant. An examination of Figure 70 shows slightly diverging lines with the low I.Q. groups being relatively similar in their means on Word Study Skills, but in the average and high intelligence categories, the i.t.a. group differs considerably in mean from that of the T.O. group. Despite the observed divergence of the lines as one increases in intelligence level, the F ratio for interaction is .87 which suggests that intelligence is not a significant factor in the observed differences and that these differences observed are the result of chance variation.

TABLE 126

TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | i.t.a. WO/K N=253 | T.O. WO/K N=206 |
|---|---|---|---|
| | Low | 24.52 | 23.86 |
| I.Q. | Average | 27.76 | 26.75 |
| | High | 30.22 | 29.87 |

TABLE 127

ANALYSIS OF VARIANCE FOR THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AT THE END OF THIRD GRADE, 1967

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1400.15 | 78.88** |
| Method | 1 | 48.68 | 2.74 |
| I.Q. x M | 2 | 4.11 | .23 |
| Error | 460 | 17.75 | |

**Significant at the .01 level of confidence

### TABLE 128

### TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | i.t.a. WO/K<br>N=253 | T.O. WO/K<br>N=206 |
|---|---|---|---|
| | Low | 37.81 | 38.89 |
| I.Q. | Average | 44.81 | 43.25 |
| | High | 49.28 | 49.44 |

### TABLE 129

### ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AT THE END OF THIRD GRADE, 1967

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 4834.01 | 75.98** |
| Method | 1 | .18 | .003 |
| I.Q. x M | 2 | 63.97 | 1.01 |
| Error | 460 | 63.62 | |

**Significant at the .01 level of confidence

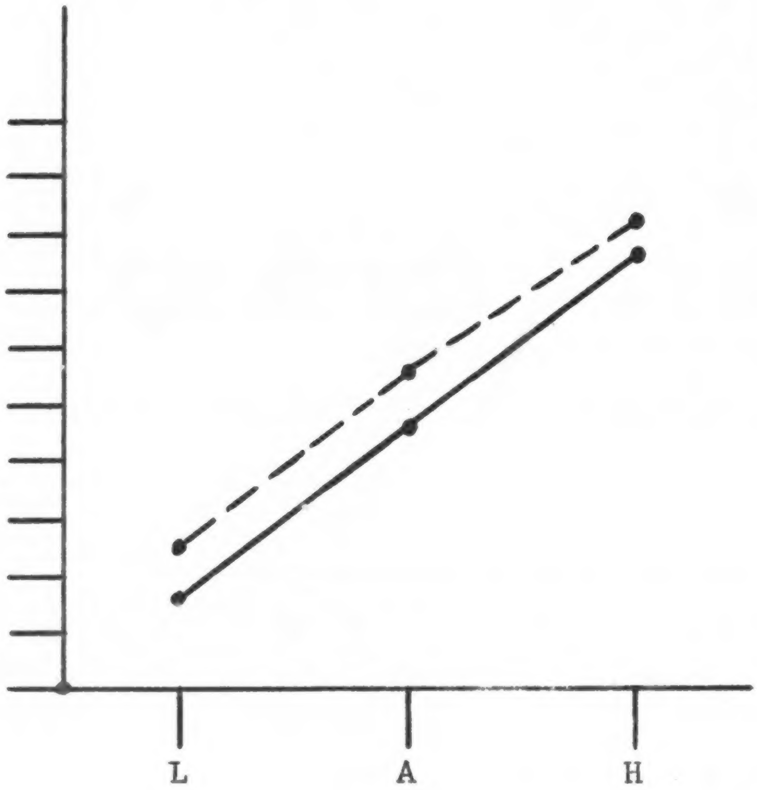

Figure 68

Relationship between Treatment and I.Q. on the Word Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. Groups without Kindergarten Reading Instruction, at the End of Third Grade, 1967

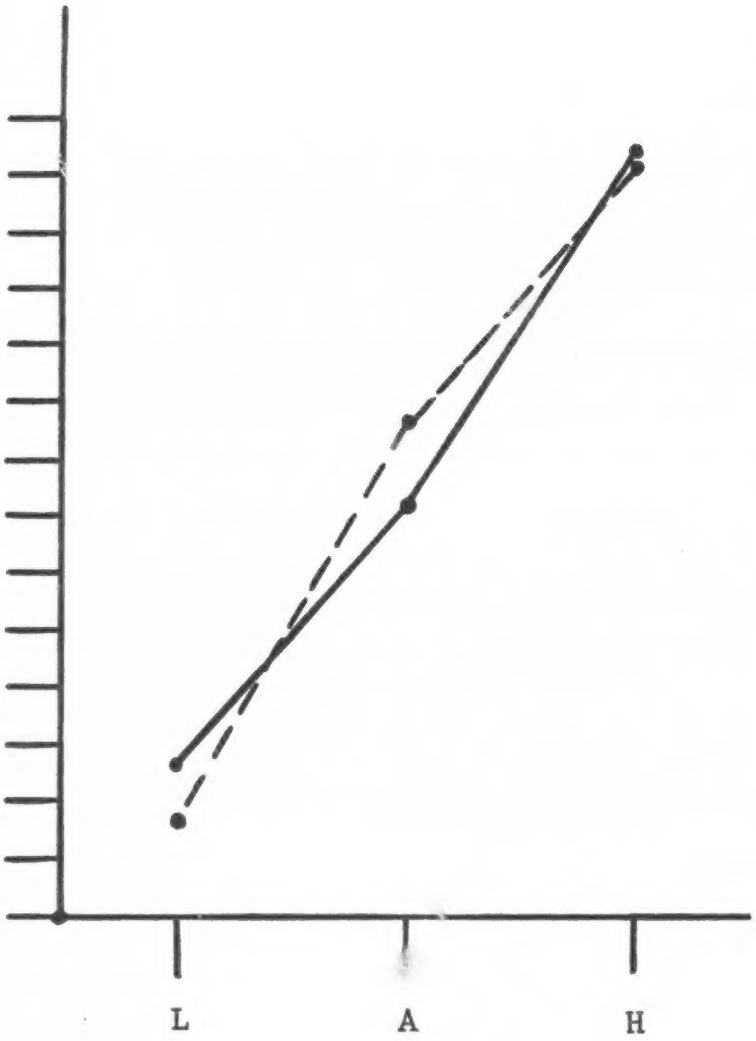

Figure 69

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. Groups without Kindergarten Reading Instruction, at the End of Third Grade, 1967

## TABLE 130

## TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | i.t.a. WO/K N=253 | T.O. WO/K N=206 |
|---|---|---|---|
| I.Q. | Low | 45.18 | 43.85 |
| | Average | 52.01 | 48.13 |
| | High | 56.34 | 52.89 |

## TABLE 131

## ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AT THE END OF THIRD GRADE, 1967

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 4379.12 | 54.54** |
| Method | 1 | 926.40 | 11.54** |
| I.Q. x M | 2 | 70.11 | .87 |
| Error | 460 | 80.29 | |

**Significant at the .01 level of confidence

Comparing the results of the i.t.a. and T.O. groups who began reading instruction at a first-grade level on the Spelling subtest of the Stanford Achievement Test Primary II reveals no significant difference between the groups as can be seen in Table 133. The F ratio of .77 is not significant. An examination of the table of means reveals that for the low-I.Q. category, T.O. children were slightly higher. For the average category of intelligence, the mean spelling score of the i.t.a.-instructed children was slightly higher, and for the high I.Q. category, the mean of the i.t.a.-instructed children was slightly superior. These differences, however, are the result of chance variation. There is a significant difference among the three categories of intelligence and the interaction of intelligence and medium of instruction is significant at the .05 level of confidence for 2 and 460 degrees of freedom. This interaction may be observed in Figure 71 which suggests that low I.Q. children spell better when originally instructed in T.O.; whereas, children of average and high intelligence spell slightly better when instructed in i.t.a.

Hence, it would appear that i.t.a. is effective as a means of improving the ability of children to decode as the ability of i.t.a.-instructed children to recognize words and analyze them was significantly superior from first grade on. The results for the i.t.a. and T.O. groups measured at the end of third grade, who had not received kindergarten instruction, were fairly similar with one modification. When instruction began at the first-grade level, children instructed in the i.t.a. medium were significantly better than their T.O. counterparts in Word Study Skills. No significant

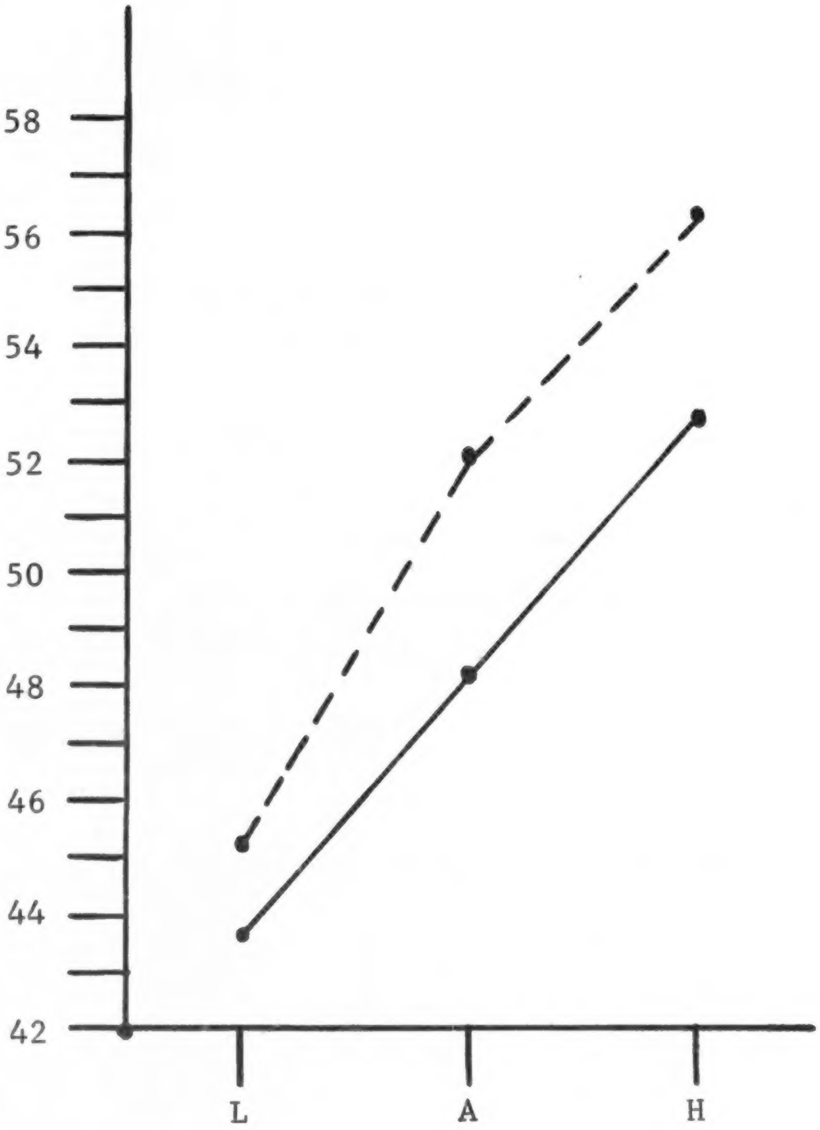

Figure 70

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. Groups without Kindergarten Reading Instruction, at the End of Third Grade, 1967

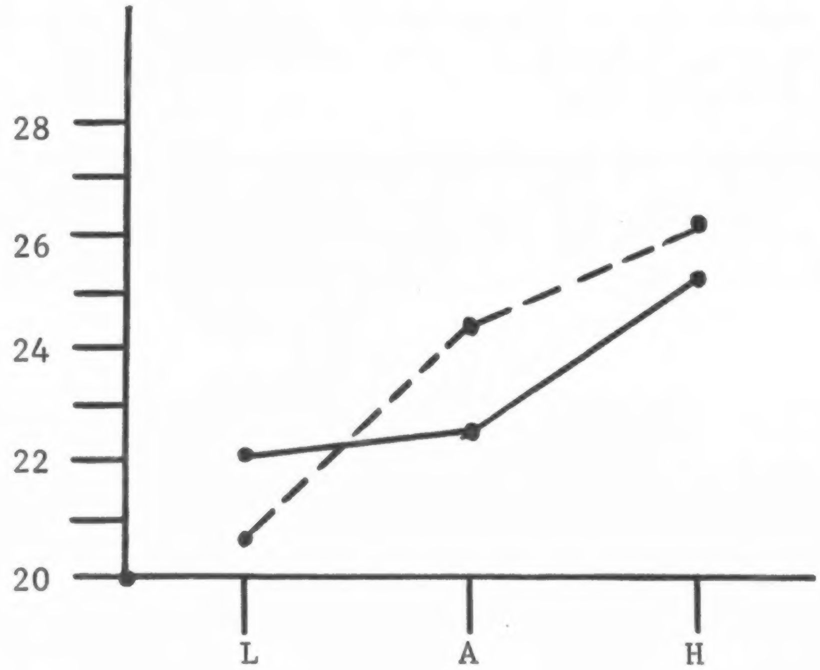

Figure 71

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. and T.O. Groups without Kindergarten Reading Instruction, at the End of Third Grade, 1967

## TABLE 132

### TABLE OF MEANS FOR THE i.t.a. AND T.O. GROUPS WITHOUT KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | i.t.a. WO/K N=253 | T.O. WO/K N=206 |
|---|---|---|---|
| | Low | 20.71 | 22.02 |
| I.Q. | Average | 24.49 | 22.60 |
| | High | 26.08 | 25.19 |

## TABLE 133

### ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION AT THE END OF THIRD GRADE, 1967

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 745.54 | 25.43** |
| Method | 1 | 22.60 | .77 |
| I.Q. x M | 2 | 99.15 | 3.38 |
| Error | 460 | 29.32 | |

**Significant at the .01 level of confidence

5

differences were found in Word Meaning or Paragraph Meaning. Hence, it would appear that when reading instruction is begun at the kindergarten level, using i.t.a. as the medium of instruction will produce better word recognition and word analysis by the end of third grade; whereas, if reading is introduced at the first-grade level, children instructed in the i.t.a. medium will be superior in Word Study Skills or word analysis. This is an additional confirmation of the fact that the more consistent medium will produce superior results in certain areas, specifically decoding. If instruction begins at a pre-first-grade level it will produce slightly superior results than if instruction begins at the first-grade level. In the area of spelling, when instruction begins at a pre-first-grade level, those children instructed in i.t.a. are significantly superior to those instructed in traditional orthography; while, in the case where instruction commences at a first-grade level, no significant difference in spelling was observed by the end of third grade between the two groups.

The third hypothesis predicted that introducing reading in traditional orthography to kindergarten children will not result in significantly better reading and spelling achievement than that attained by children who are formally introduced to reading in T.O. in first grade, when both groups are measured at the end of third grade. Table 135 presents the results of the analysis of variance on the Word Meaning subtest of the Stanford Achievement Test Primary II. An inspection of the table of means in Table 134 reveals very slight differences for each category of intelligence with differences of less than one point between the two groups for each I.Q. category

## TABLE 134

## TABLE OF MEANS FOR T.O. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | T.O. WO/K N=206 | T.O. WK N=206 |
|---|---|---|---|
| | Low | 23.86 | 23.21 |
| I.Q. | Average | 26.75 | 26.53 |
| | High | 29.87 | 28.75 |

## TABLE 135

## ANALYSIS OF VARIANCE FOR THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1967) AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1968) AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1237.00 | 63.80** |
| Method | 1 | 47.57 | 2.45 |
| I.Q. x M | 2 | 6.45 | .33 |
| Error | 406 | 19.39 | |

**Significant at the .01 level of confidence

with the exception of the high intelligence category. In that category, the mean difference is slightly over one point. All the differences as may be observed, are in favor of the T.O. group who had begun instruction at the first-grade level. The F ratio obtained for these differences was 2.45 which is not significant. Hence, the hypothesis that no significant increase in performance will occur from beginning reading instruction earlier is confirmed. There is a significant difference for intelligence at beyond the .01 level which reflects the significant differences among the intelligence categories. The Figure 72 is a graphic representation of the means obtained by intelligence category and the relative parallelism of the two lines suggests no interaction. This is confirmed in the analysis of variance as the computed F ratio of .33 is not significant.

On the Paragraph Meaning subtest of the Stanford Achievement Test, an inspection of the means in Table 136 again reveals very slight differences for each I.Q. category, with the means of the T.O. group whose reading instruction had begun at a first-grade level slightly higher. In each case, however, the mean differences are less than one point. The analysis of variance for this subtest is presented in Table 137. The very slight differences observed are probably due to chance variation as the computed F ratio is .01 which is certainly not significant. Again, a significant difference was obtained for intelligence, which reflects the fact that there are strongly significant differences among the intelligence categories. Examination of Figure 73 again reveals lines that are relatively parallel and this is confirmed statistically in the analysis of variance table as the

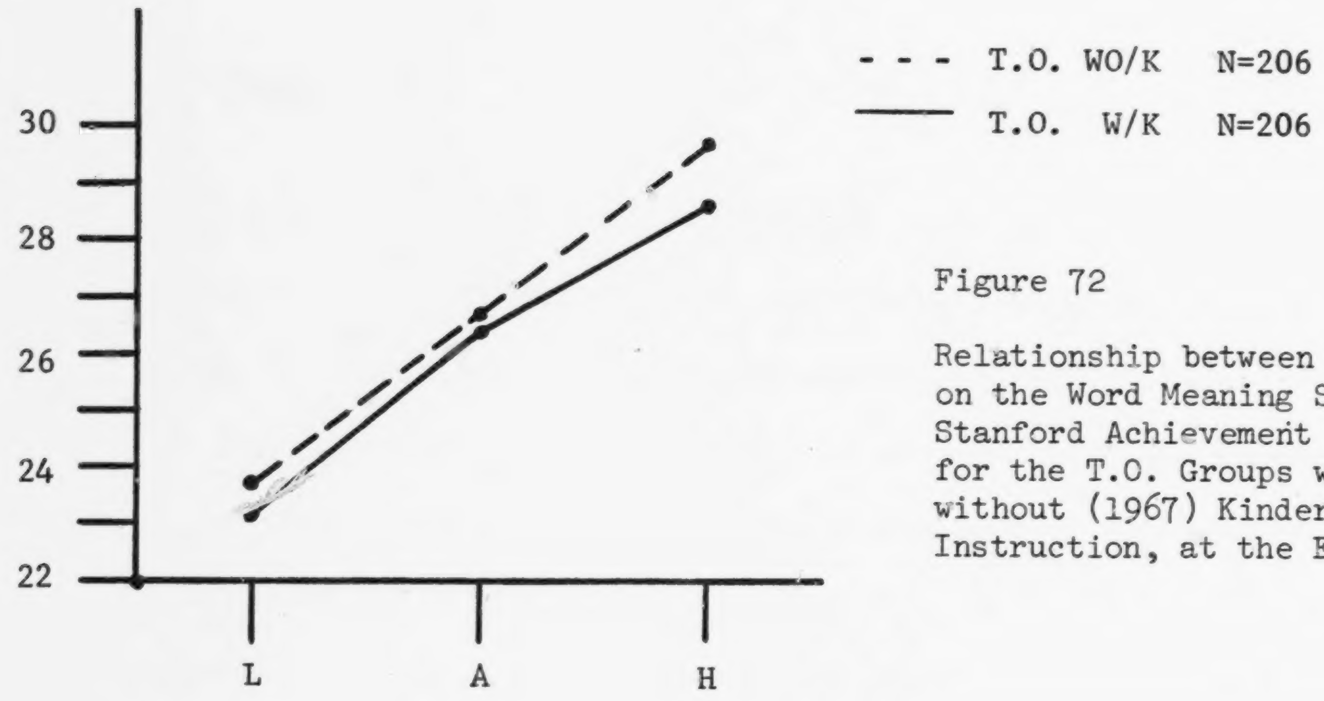

Figure 72

Relationship between Treatment and I.Q. on the Word Meaning Subtest of the Stanford Achievement Test, Primary II, for the T.O. Groups with (1968) and without (1967) Kindergarten Reading Instruction, at the End of Third Grade

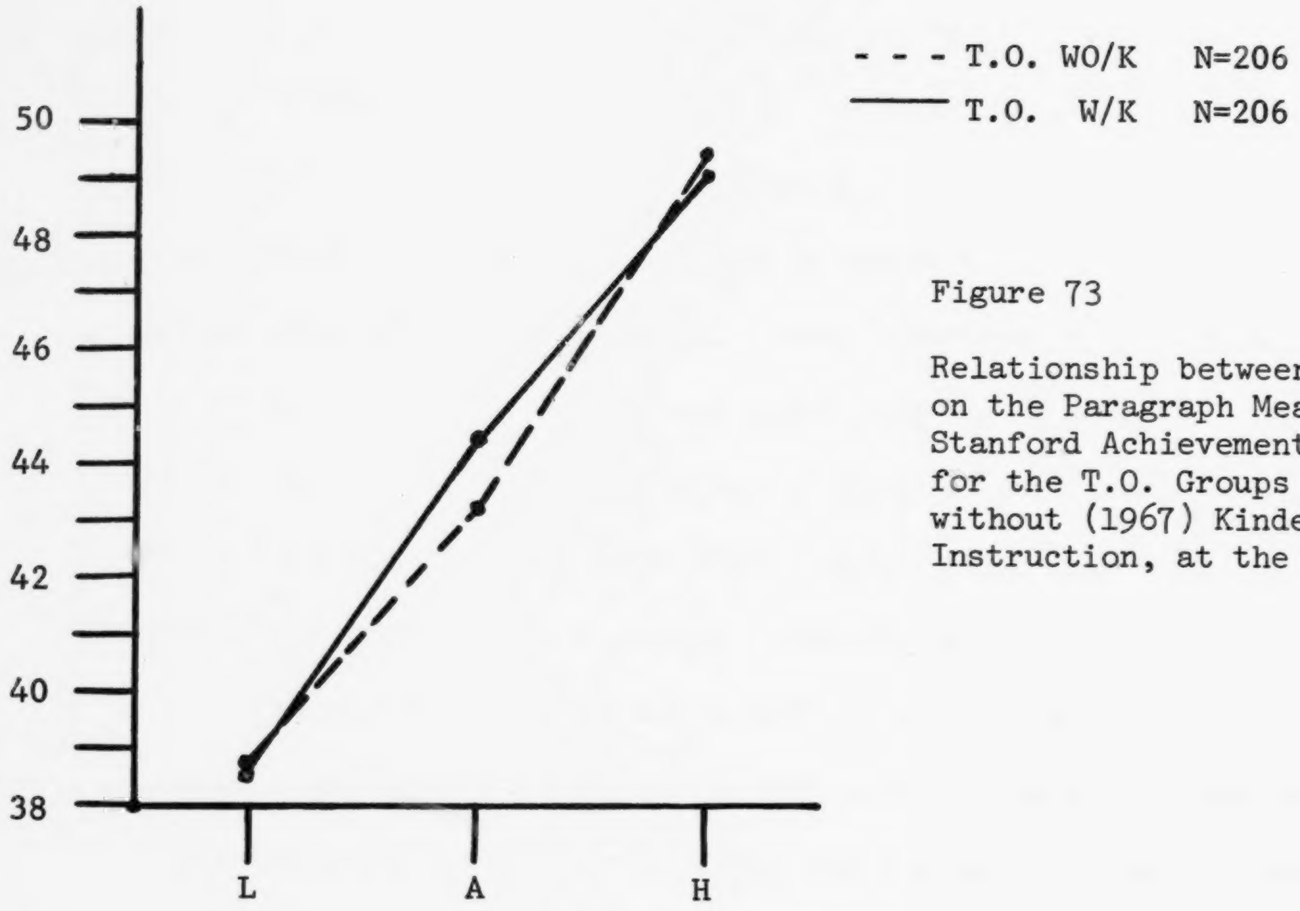

Figure 73

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary II, for the T.O. Groups with (1968) and without (1967) Kindergarten Reading Instruction, at the End of Third Grade

## TABLE 136

## TABLE OF MEANS FOR T.O. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | T.O. WO/K N=206 | T.O. WK N=206 |
|---|---|---|---|
| | Low | 38.89 | 38.61 |
| I.Q. | Average | 43.25 | 44.40 |
| | High | 49.44 | 49.03 |

## TABLE 137

## ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1967) AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1968) AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 4032.33 | 64.25** |
| Method | 1 | .72 | .01 |
| I.Q. x M | 2 | 23.24 | .37 |
| Error | 406 | 62.76 | |

**Significant at the .01 level of confidence

computed F ratio for interaction is .37 which is not significant.

In the area of Word Study Skills, an examination of the table of means reveals that in the low intelligence category, the T.O. group without kindergarten instruction was slightly more than one point higher than the mean of the T.O. group with kindergarten instruction. For the average category of intelligence, the mean of the T.O. group with kindergarten instruction was slightly greater than one point higher than the mean of the T.O. group without kindergarten instruction; while for the high intelligence category, the mean of the T.O. group without kindergarten instruction was slightly greater than one point higher than the mean of the T.O. group with kindergarten instruction. The analysis of variance determining the significance of these differences is presented in Table 139. As can be observed, these very slight mean differences are very probably the result of chance factors as the computed F ratio for method is .16, which is certainly not statistically significant. As is true in all of these analyses of variance, the F ratio for intelligence is significant at well beyond the .01 level, indicating that there is a strongly significant difference among the categories of intelligence. An examination of Figure 74 shows lines that practically coincide and have a slight crossing effect in the middle. Despite the intersection of the two lines in the average category of intelligence there is no significant interaction as may be observed in the table presenting the analysis of variance where the F ratio for intelligence by method is 1.13, which is not significant.

For the Spelling subtest, the table of means reveals slightly higher

## TABLE 138

## TABLE OF MEANS FOR T.O. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | T.O. WO/K N=206 | T.O. WK N=206 |
|---|---|---|---|
| | Low | 43.85 | 42.59 |
| I.Q. | Average | 48.13 | 49.95 |
| | High | 52.89 | 51.70 |

## TABLE 139

## ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1967) AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1968) AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 3152.78 | 36.54** |
| Method | 1 | 13.50 | .16 |
| I.Q. x M | 2 | 97.30 | 1.13 |
| Error | 406 | 86.28 | |

**Significant at the .01 level of confidence

means for the T.O. group without kindergarten instruction for each category of intelligence. The means for the average and high intelligence categories are less than one point greater for the T.O. group without kindergarten instruction; while in the low intelligence category, the T.O. mean for the group without kindergarten instruction is slightly greater than one point higher. The fact that these differences are very probably due to chance factors may be observed in Table 141 which presents the computations for the analysis of variance on this subtest. The computed F ratio for 1 and 406 degrees of freedom is not statistically significant although it does approach significance. The required F ratio for the 5% level of confidence is 3.86. Nevertheless, the hypothesis that no difference will occur regardless of the time at which instruction begins is confirmed. There again is a significant difference for intelligence which suggests that the differences among the intelligence categories are significant. An examination of Figure 75 reveals lines that are relatively parallel, which is confirmed in the computed analysis of variance for interaction which resulted in an F ratio of .26, which, for 2 and 406 degrees of freedom, is certainly not significant.

In summary, the hypothesis that predicted no significant difference in reading and spelling achievement when reading instruction is introduced at a pre-first-grade level in traditional orthography, over that obtained when reading instruction begins at a first-grade level, is confirmed. This would suggest that the decision as to whether reading instruction should begin at a pre-first-grade level or at a first-grade level, should be made

### TABLE 140

### TABLE OF MEANS FOR THE T.O. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | T.O. WO/K N=206 | T.O. WK N=206 |
|---|---|---|---|
| | Low | 22.02 | 20.43 |
| I.Q. | Average | 22.60 | 21.76 |
| | High | 25.19 | 24.47 |

### TABLE 141

### ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1967) AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1968) AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 499.00 | 15.23** |
| Method | 1 | 123.95 | 3.78 |
| I.Q. x M | 2 | 8.45 | .26 |
| Error | 406 | 32.76 | |

**Significant at the .01 level of confidence

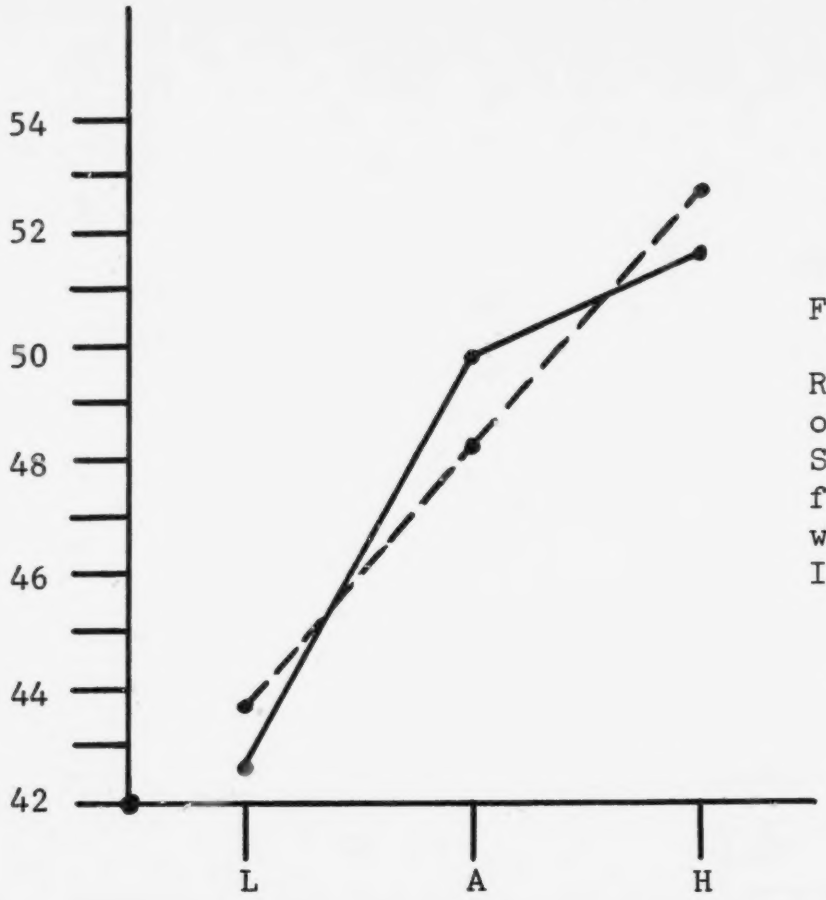

Figure 74

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary II, for the T.O. Groups with (1968) and without (1967) Kindergarten Reading Instruction, at the End of Third Grade

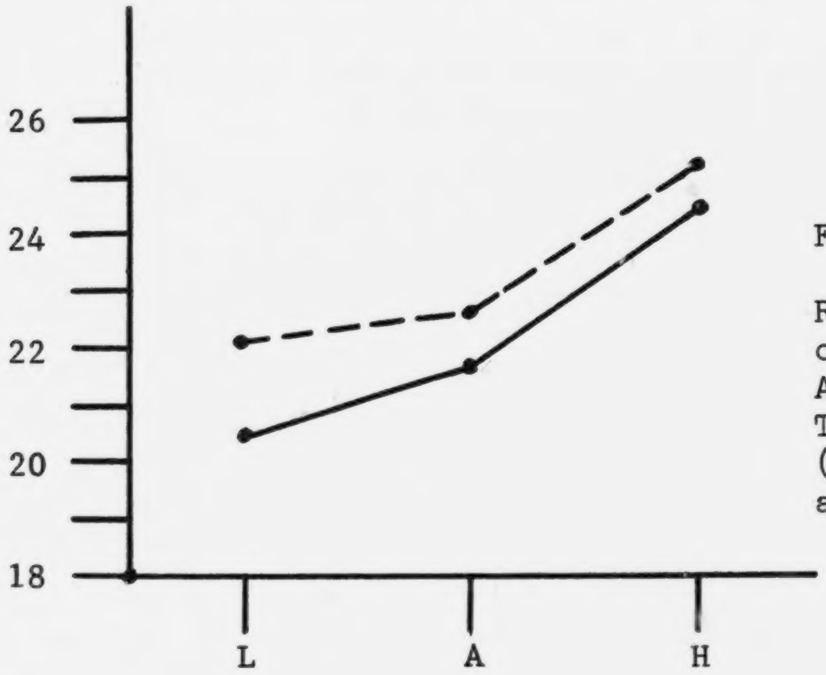

Figure 75

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary II, for the T.O. Groups with (1968) and without (1967) Kindergarten Reading Instruction, at the End of Third Grade on an individual basis and should not be made as a policy for all classes and all children in those classes, as no difference seems to result at the end of third grade for the total groups, regardless of the time of beginning instruction in reading.

The fourth hypothesis stated that introducing a consistent medium such as i.t.a. to kindergarten children will result in significantly better reading achievement than that attained by children who begin formal reading instruction in first grade, in i.t.a., when both groups are measured at the end of third grade. From an examination of the table of means (Table 142) it may be observed that the i.t.a. group with kindergarten, and the i.t.a. without kindergarten, exhibit mean differences for each intelligence category, which, at its maximum, is .12 of a point. It would not be expected that mean differences so small would be significant which is confirmed in the analysis of variance presented in Table 143. The computed F ratio for this difference is .01 which confirms the lack of significance. There is, of course, a significant difference for intelligence beyond the .01 level of confidence, suggesting that divisions of the sample by intelligence produce significant differences among the three categories. Figure 76 which presents the comparison of means by intelligence categories graphically, reveals lines which virtually coincide. The lack of interaction is confirmed in the analysis of variance table, as the computed F ratio for intelligence by method is .04 which is certainly not significant.

On the Paragraph Meaning subtest, a comparison of means of the two i.t.a. groups reveals less than one point differences in favor of the i.t.a.

## TABLE 142

## TABLE OF MEANS FOR THE i.t.a. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | i.t.a. WO/K N=253 | i.t.a. WK N=297 |
|---|---|---|---|
| I.Q. | Low | 24.52 | 24.64 |
| | Average | 27.76 | 27.67 |
| | High | 30.22 | 30.12 |

## TABLE 143

## ANALYSIS OF VARIANCE FOR THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1967) AND THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1968) AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1362.85 | 70.58** |
| Method | 1 | .18 | .01 |
| I.Q. x M | 2 | .69 | .04 |
| Error | 551 | 19.31 | |

**Significant at the .01 level of confidence

group who began reading instruction at the kindergarten level for the average and high intelligence categories. The difference in means for the low intelligence category is approximately 2-1/2 points in favor of the i.t.a. group with kindergarten instruction. The table presenting the results of the analysis of variance is numbered 145. This table presents an F ratio of 3.08 which for 1 and 550 degrees of freedom is not significant, although it does approach significance at the .05 level of confidence. Hence, the differences observed in favor of the i.t.a. group with kindergarten instruction could have resulted from chance factors. There is a significant difference among the intelligence groups as may be observed by the extremely large F ratio for the main effect of intelligence of 78.25. Figure 77 again reveals lines that are relatively parallel in comparing the means by intelligence category for each of the i.t.a. groups. The test as to whether any interaction exists in this situation reveals an F ratio of 1.07 which suggests that the slightly different slope between the low and average category is not sufficient to produce a significant interaction and could have resulted from chance factors.

The means for the Word Study Skills subtest for the two i.t.a. groups under discussion may be seen in Table 146. The observed differences are quite small, the largest difference being .7 of a point in the low intelligence category in favor of the i.t.a. group with kindergarten. There is virtually no difference for the average intelligence category, and for the high intelligence category. One would not expect such small differences to be significant and Table 147 reveals that the computed F ratio for these

## TABLE 144

### TABLE OF MEANS FOR THE i.t.a. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | i.t.a. WO/K N=253 | i.t.a. WK N=297 |
|---|---|---|---|
| | Low | 37.81 | 40.40 |
| I.Q. | Average | 44.81 | 44.97 |
| | High | 49.28 | 50.33 |

## TABLE 145

### ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1967) AND THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1968) AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 4853.13 | 78.25** |
| Method | 1 | 190.92 | 3.08 |
| I.Q. x M | 2 | 66.61 | 1.07 |
| Error | 551 | 62.02 | |

**Significant at the .01 level of confidence

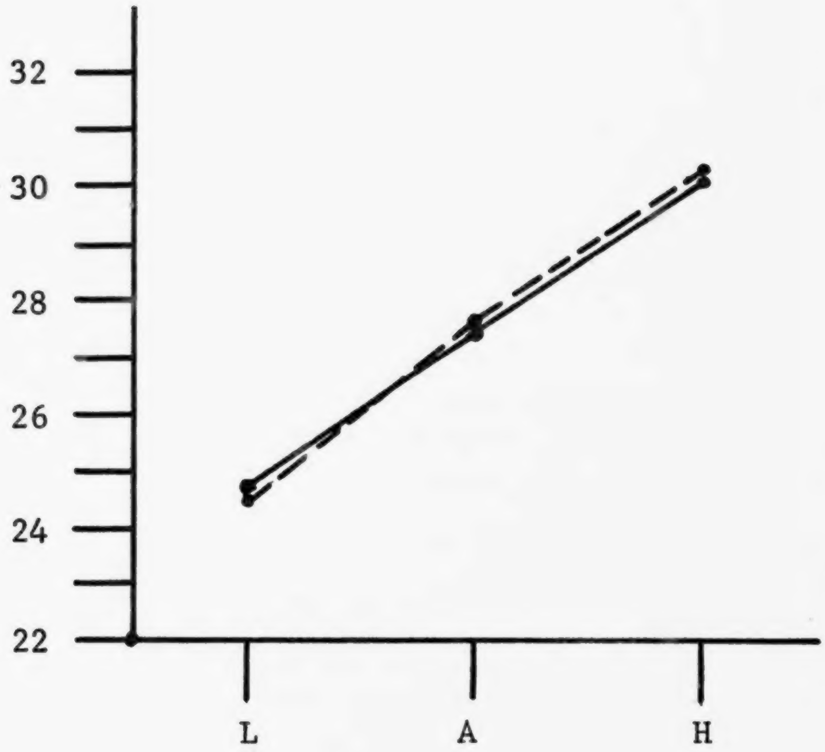

Figure 76

Relationship between Treatment and I.Q. on the Word Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Groups with (1968) and without (1967) Kindergarten Reading Instruction, at the End of Third Grade

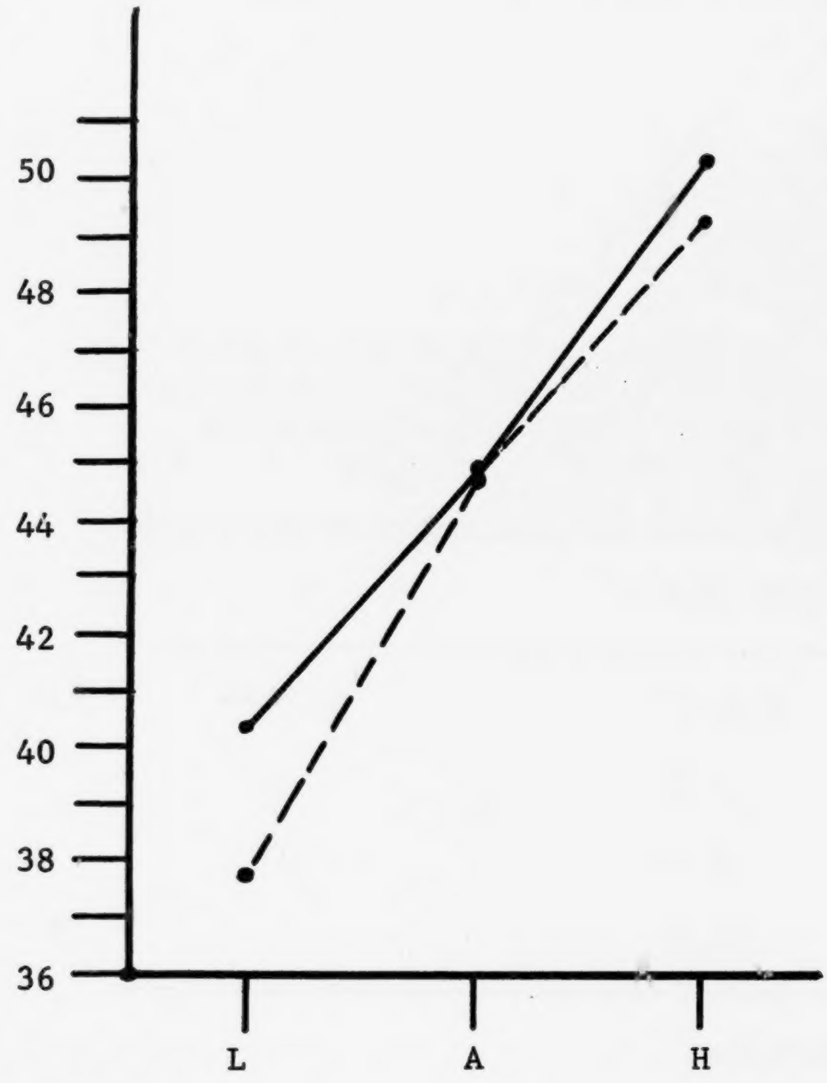

Figure 77

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Groups with (1968) and without (1967) Kindergarten Reading Instruction, at the End of Third Grade

TABLE 146

TABLE OF MEANS FOR THE i.t.a. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | i.t.a. WO/K N=253 | i.t.a. WK N=297 |
|---|---|---|---|
| | Low | 45.18 | 45.88 |
| I.Q. | Average | 52.01 | 51.91 |
| | High | 56.34 | 56.21 |

TABLE 147

ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1967) AND THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1968) AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 5031.07 | 62.50** |
| Method | 1 | 2.01 | .03 |
| I.Q. x M | 2 | 9.44 | .12 |
| Error | 551 | 80.50 | |

**Significant at the .01 level of confidence

differences is .03, which is certainly not significant. There is again, however, a significant difference among the intelligence categories which would be expected in terms of the procedures used to divide the groups into different intelligence categories. Figure 78 graphically presents the means for each of the intelligence categories for each of the two groups and reveals lines that practically coincide. The lack of interaction which can be graphically observed is confirmed in the statistically computed interaction which results in an F ratio of .12 which is not significant.

An examination of the table of means for the Spelling subtest (Table 148) exhibits a difference of approximately 1-1/2 points in favor of the i.t.a. group with kindergarten instruction for the low intelligence category, and a difference of approximately 1.2 points in favor of the i.t.a. group without kindergarten instruction for the average category of intelligence. For the high category of intelligence the mean of 26.08 for the i.t.a. group without kindergarten instruction was slightly higher than the mean spelling score of 25.41 for the i.t.a. group with kindergarten instruction in that intelligence category. Table 149 reveals that these differences are very likely due to chance factors as the computed F ratio for these two groups was .15, which is certainly not significant. There is again a significant difference among the intelligence categories reflecting the procedure used in establishing these categories. Figure 79 graphically presents these means and this does exhibit some interaction effects. The statistical test for interaction yields an F ratio of 3.1 which is barely significant at the .05 level of confidence. This would suggest that intel-

## TABLE 148

### TABLE OF MEANS FOR THE i.t.a. GROUPS WITH AND WITHOUT KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | i.t.a. WO/K N=253 | i.t.a. WK N=297 |
|---|---|---|---|
| | Low | 20.71 | 22.35 |
| I.Q. | Average | 24.49 | 23.33 |
| | High | 26.08 | 25.41 |

## TABLE 149

### ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1967) AND THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1968) AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 749.54 | 24.18** |
| Method | 1 | 4.51 | .15 |
| I.Q. x M | 2 | 96.24 | 3.10* |
| Error | 551 | 31.00 | |

*Significant at the .05 level of confidence
**Significant at the .01 level of confidence

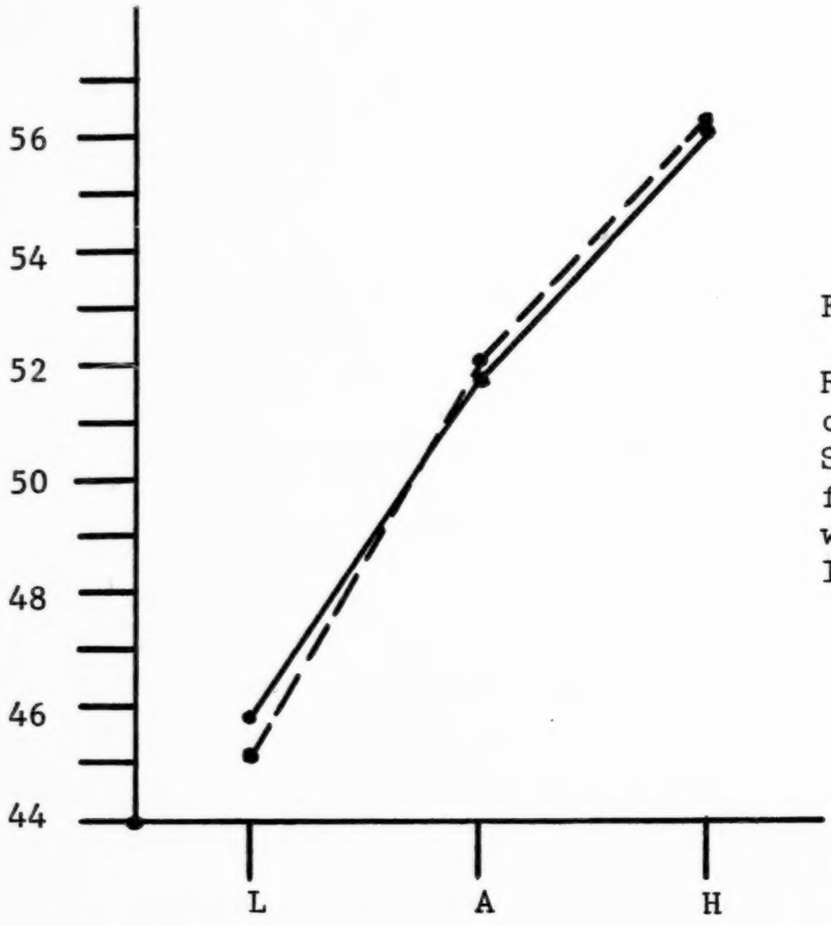

Figure 78

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Groups with (1968) and without (1967) Kindergarten Reading Instruction, at the End of Third Grade

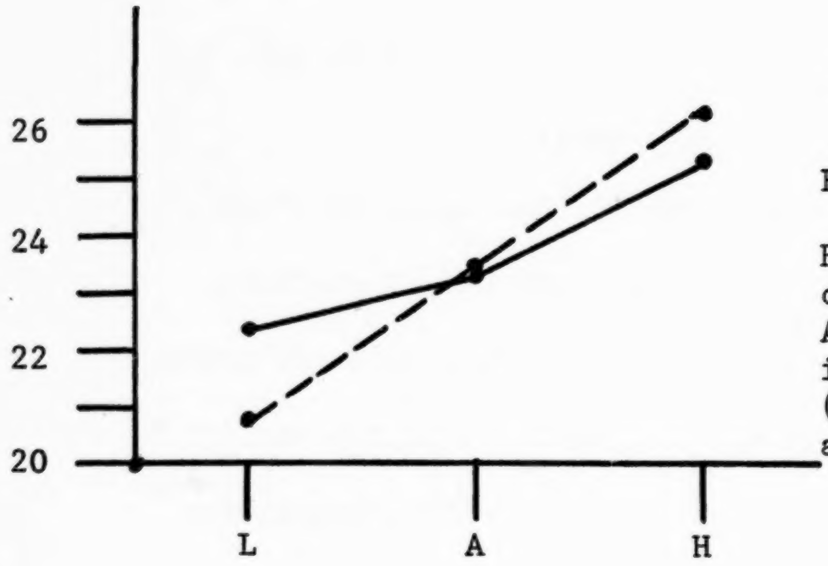

Figure 79

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Groups with (1968) and without (1967) Kindergarten Reading Instruction, at the End of Third Grade ligence is an important factor in determining the time at which instruction should begin in i.t.a. It would suggest that for children of low intelligence, beginning reading instruction at a pre-first-grade level in i.t.a. is advantageous; whereas, for children of average intelligence, or high intelligence, it would appear that beginning reading instruction at a first-grade level will produce slightly better results, or no significant difference in spelling achievement.

In summary, it would appear that a general decision to begin reading instruction in i.t.a. at a pre-first-grade level is not warranted, since at the end of third grade no significant differences in achievement are observed on any of the three reading subtests of the Stanford Achievement Test Primary II, or on the Spelling subtest. Thus, decisions made as to the appropriate time to begin reading instruction in i.t.a. should be made on an individual basis rather than on a total-group basis.

The fifth hypothesis predicted that introducing i.t.a. to first-grade children will result in significantly better reading and spelling achievement than that attained by children who begin formal reading instruction in kindergarten in T.O. when both groups are measured at the end of third grade. The results of this hypothesis for each of the appropriate subtests of the Stanford Achievement Test follow. For Word Meaning, an examination of the table of means reveals a slightly superior performance for the i.t.a. group without kindergarten over the T.O. group with kindergarten for each category of intelligence. The differences are greater than 1 point for each intelligence category. The analysis of variance computed for these means can be seen in Table 151. The computed F ratio of 10.12 is significant at well beyond the .01 level of confidence for 1 and 460 degrees of freedom. This suggests that the i.t.a. group without kindergarten instruction was significantly superior on this subtest when compared to the T.O. group with kindergarten instruction. There is also a significant difference at well beyond the .01 level of confidence for intelligence, which suggests that differences among the intelligence categories are strongly significant. An examination of Figure 80 graphically represents the comparison of means for each of the two treatment groups for each category of intelligence. As can be seen, the means for the i.t.a. group are slightly higher than the T.O. group for each category of intelligence, and the lines are somewhat parallel. The lack of interaction is confirmed statistically as the F ratio for the interaction of intelligence and treatment was .03 for which 2 and 460 degrees of freedom is not significant.

On the Paragraph Meaning subtest of the Stanford Achievement Test, the means for the low I.Q. group were 37.81 for the i.t.a. group without kindergarten instruction, and 38.61 for the T.O. group with kindergarten instruction. For the average I.Q. group, the means were 44.81 and 44.40, respectively, and for the high intelligence category, the means were 49.28 and 49.03, respectively. These differences are all quite small as they are less than one point. The T.O. group was less than one point superior for the low category of intelligence; whereas the i.t.a. group without kindergarten instruction was slightly higher in the average and high intelligence categories. Table 153 reveals that these slight differences are not sig-

## TABLE 150

## TABLE OF MEANS FOR THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | T.O. WK N=206 | i.t.a. WO/K N=253 |
|---|---|---|---|
| | Low | 23.21 | 24.52 |
| I.Q. | Average | 26.53 | 27.76 |
| | High | 28.75 | 30.22 |

## TABLE 151

## ANALYSIS OF VARIANCE FOR THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1967) AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1968) AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1335.65 | 66.35** |
| Method | 1 | 203.76 | 10.12** |
| I.Q. x M | 2 | .58 | .03 |
| Error | 460 | 20.13 | |

**Significant at the .01 level of confidence

## TABLE 152

## TABLE OF MEANS FOR THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | T.O. WK N=206 | i.t.a. WO/K N=253 |
|---|---|---|---|
| | Low | 38.61 | 37.81 |
| I.Q. | Average | 44.40 | 44.81 |
| | High | 49.03 | 49.28 |

## TABLE 153

## ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1967) AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1968) AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 4748.74 | 70.17** |
| Method | 1 | .36 | .01 |
| I.Q. x M | 2 | 16.33 | .24 |
| Error | 460 | 67.67 | |

**Significant at the .01 level of confidence

nificant as the computed F ratio was .01. A significant difference is observed for intelligence suggesting strong differences among intelligence categories. Figure 81 provides a visual representation of the means by intelligence categories for each of the two treatment groups. As can be observed, the lines relatively coincide, although there is one slight interaction. No significant interaction would appear to exist on the basis of the graph and this is confirmed statistically. The computed F ratio for interaction of .24 which is not significant, suggests that the slight intersection observed is very likely due to chance factors.

In Word Study Skills, the means of the i.t.a. group were higher than the means of the T.O. group for each intelligence category. The means for the i.t.a. group without kindergarten instruction were 45.18, 52.01, and 56.34, respectively, for low, average and high intelligence; while the means for the T.O. group with kindergarten instruction were 42.59, 49.95, and 51.70, respectively, for low, average and high intelligence. As can be seen, the means of the i.t.a. group without kindergarten instruction were more than 2 points higher than those of the T.O. group for each category of intelligence. Table 155 presents the results for the Word Study Skills subtest. The obtained F ratio of 12.99 is significant at beyond the .01 level of confidence for 1 and 460 degrees of freedom, which suggests the differences observed in favor of the i.t.a. group are likely due to the medium of instruction, rather than chance possibility. The F ratio for I.Q. was significant at beyond the .01 level of confidence which suggests significant differences among the intelligence categories. Figure 82 visually

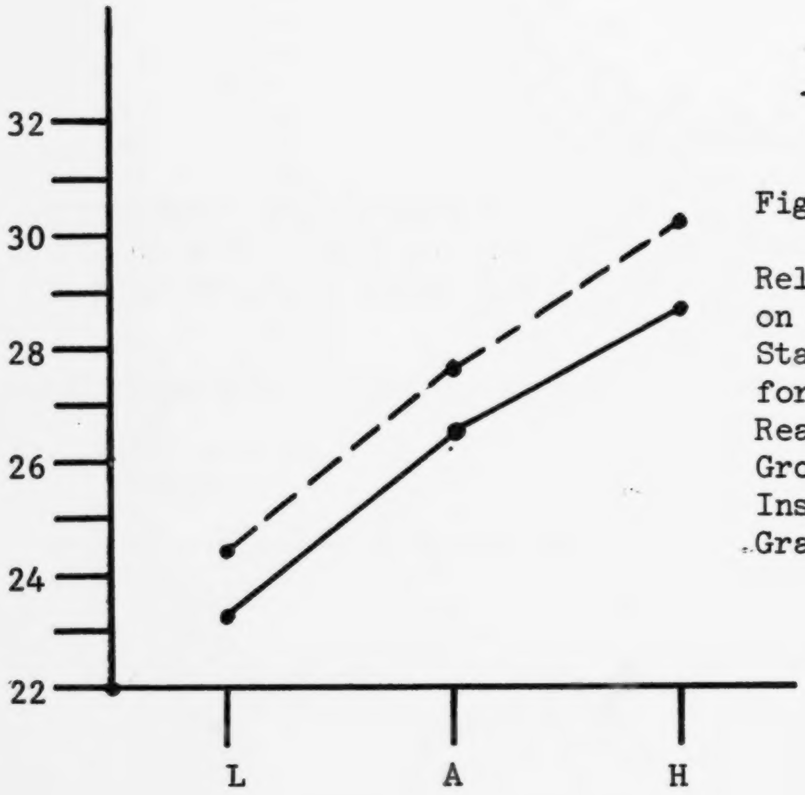

Figure 80

Relationship between Treatment and I.Q. on the Word Meaning Subtest of the Stanford Achievement Test, Primary II, for the T.O. Group with Kindergarten Reading Instruction (1968) and the i.t.a. Group without Kindergarten Reading Instruction (1967), at the End of Third Grade

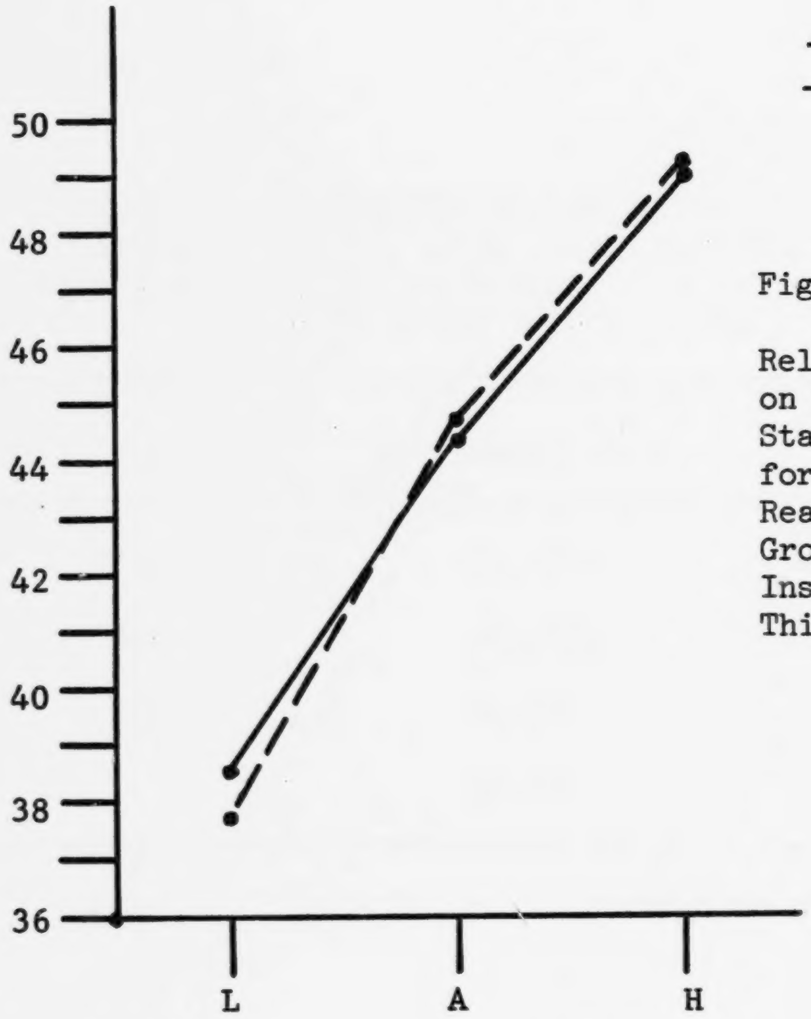

Figure 81

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary II, for the T.O. Group with Kindergarten Reading Instruction (1968) and the i.t.a. Group without Kindergarten Reading Instruction (1967), at the End of Third Grade

## TABLE 154

## TABLE OF MEANS FOR THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | T.O. WK N=206 | i.t.a. WO/K N=253 |
|---|---|---|---|
| | Low | 42.59 | 45.18 |
| I.Q. | Average | 49.95 | 52.01 |
| | High | 51.70 | 56.34 |

## TABLE 155

## ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1967) AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1968) AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 4664.07 | 55.00** |
| Method | 1 | 1101.94 | 12.99** |
| I.Q. x M | 2 | 70.24 | .83 |
| Error | 460 | 84.80 | |

**Significant at the .01 level of confidence

represents these mean differences between the two treatment groups. Although the differences between the two groups seem to increase as intelligence increases, no significant interaction exists, as can be seen in the statistical computation which yielded an F ratio of .83 which is not significant. Hence, these differences are likely due to chance possibilities.

On the Spelling subtest of the Stanford Achievement Test, the mean difference in spelling achievement for the low intelligence category was very small; whereas, the mean differences for the average and high intelligence categories were slightly greater, with a difference of over 2 points for the average category of intelligence, and a difference of approximately 1-1/2 points for the high intelligence category, with all differences being in favor of the i.t.a. group without kindergarten instruction over the T.O. group with kindergarten instruction. As can be seen in Table 157, the F ratio of 9.07 is significant at beyond the .01 level of confidence which suggests that the group instructed in i.t.a. was significantly superior in spelling than the group instructed in T.O. Figure 83 would not appear to produce lines that are relatively parallel. However, statistically comparing the interaction between intelligence and medium yields an F ratio of 1.92 which suggests that the differences observed are likely due to chance factors and not the result of any strong interaction between intelligence and medium. Hence, it would not appear that intelligence is a major factor in determining which medium of instruction should be employed.

In summary, the i.t.a. group without kindergarten instruction was significantly better in the areas of word recognition and word analysis when compared to the T.O. group that began reading instruction at the

## TABLE 156

## TABLE OF MEANS FOR THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | T.O. WK N=206 | i.t.a. WO/K N=253 |
|---|---|---|---|
| | Low | 20.43 | 20.71 |
| I.Q. | Average | 21.76 | 24.49 |
| | High | 24.47 | 26.08 |

## TABLE 157

## ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE i.t.a. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1967) AND THE T.O. GROUP WITH KINDERGARTEN READING INSTRUCTION (1968) AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 942.36 | 32.24** |
| Method | 1 | 265.09 | 9.07** |
| I.Q. x M | 2 | 56.19 | 1.92 |
| Error | 460 | 29.23 | |

**Significant at the .01 level of confidence

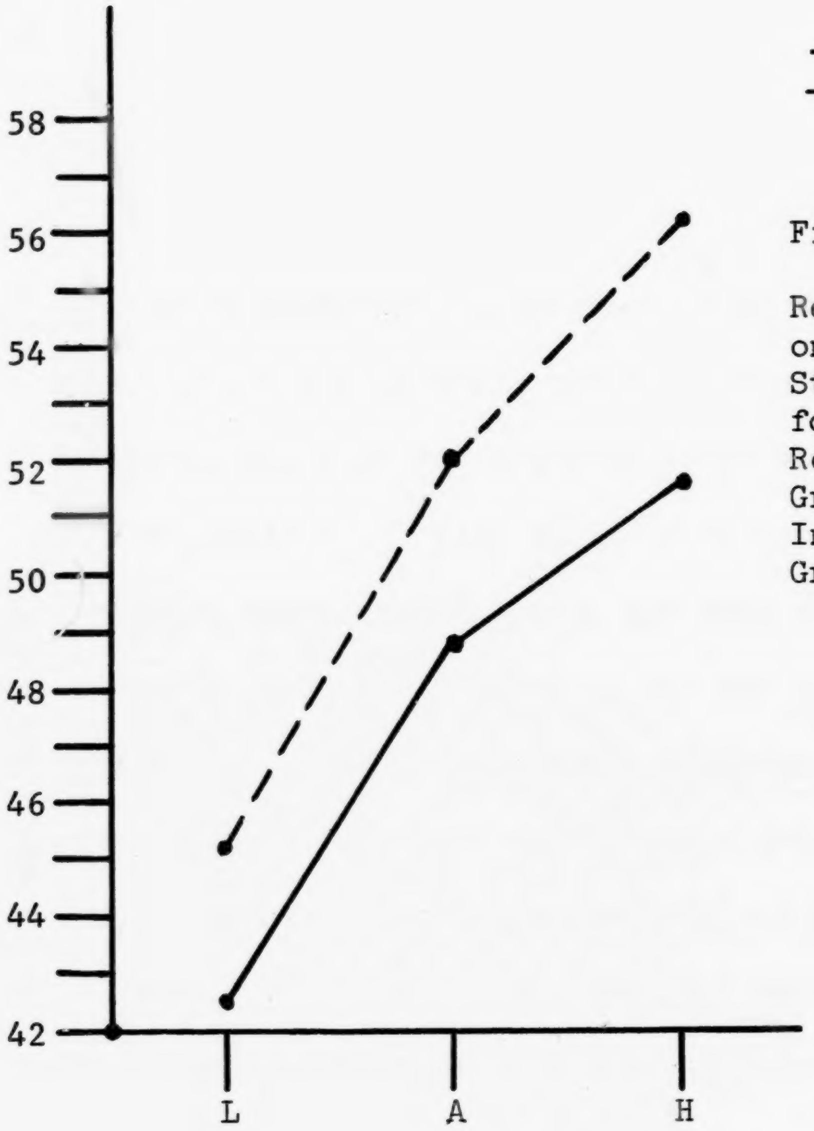

Figure 82

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary II, for the T.O. Group with Kindergarten Reading Instruction (1968) and the i.t.a. Group without Kindergarten Reading Instruction (1967), at the End of Third Grade

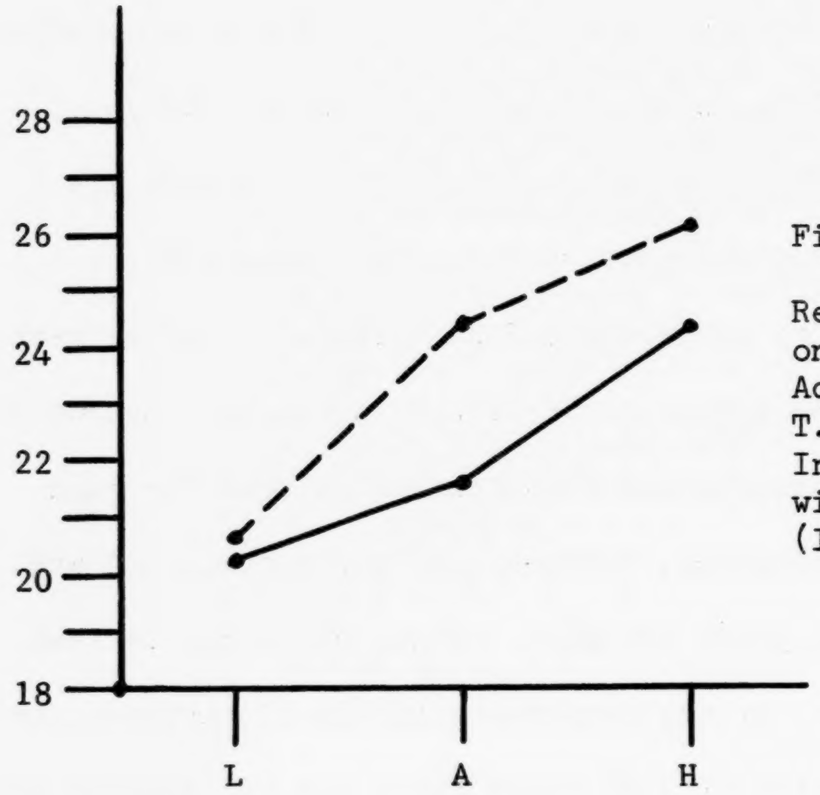

Figure 83

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary II, for the T.O. Group with Kindergarten Reading Instruction (1968) and the i.t.a. Group without Kindergarten Reading Instruction (1967), at the End of Third Grade kindergarten level. No differences were observed in comprehension as measured by the Paragraph Meaning subtest of the Stanford Achievement Test Primary II. The spelling ability of those children who were instructed in i.t.a. was significantly better than the spelling ability of those children instructed in T.O. despite the fact that the T.O. children began reading instruction at an earlier time than the i.t.a. group did. Thus, although at the conclusion of the first year, children instructed in the i.t.a. medium were significantly poorer in spelling ability than their T.O. counterparts, by the end of third grade, the i.t.a.-instructed children performed at a significantly higher level than those children instructed in T.O., when i.t.a. instruction is begun in first grade and T.O. instruction begins at a pre-first-grade level.

The final hypothesis stated that introducing reading in i.t.a. to kindergarten children will result in significantly better reading and spelling achievement than that attained by children who are formally introduced to reading in first grade in traditional orthography when both groups are measured at the end of third grade. The test of this hypothesis for the Word Meaning subtest of the Stanford Achievement Test Primary II may be seen in Table 159. For this subtest the i.t.a. group with kindergarten instruction had slightly higher mean scores for the Word Meaning subtest for each intelligence category. These differences, however, are quite small and are less than one point in each intelligence category. These means may be seen in Table 158. Consulting the table of the computed analysis of variance for this subtest, we calculate an F ratio of 2.68 which for 1 and 497 degrees of

## TABLE 158

## TABLE OF MEANS FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | i.t.a. WK N=297 | T.O. WO/K N=206 |
|---|---|---|---|
| | Low | 24.64 | 23.86 |
| I.Q. | Average | 27.67 | 26.75 |
| | High | 30.12 | 29.87 |

## TABLE 159

## ANALYSIS OF VARIANCE FOR THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1967) AND THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1968) AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 1368.46 | 73.50** |
| Method | 1 | 49.99 | 2.68 |
| I.Q. x M | 2 | 4.89 | .26 |
| Error | 497 | 18.62 | |

**Significant at the .01 level of confidence

freedom is not significant. For the .05 level of confidence an F ratio of 3.86 is required. Hence, the differences observed in each category of intelligence showing a slightly superior performance for the i.t.a. children are very likely due to chance factors and certainly cannot be considered to be the result of the medium of instruction with any degree of confidence. The F ratio for intelligence was significant at beyond the .01 level of confidence which reflects the significant differences occurring among the intelligence categories. Figure 84 graphically represents the means for each of the two treatment groups under consideration by category of intelligence. As may be observed, the lines are relatively parallel, with the line for the i.t.a. group slightly above that of the T.O. group for each category. The test for interaction produced an F ratio of .26 which is not significant. Hence, any slight variations in the slopes of the two lines are very likely due to chance possibility.

On the Paragraph Meaning subtest of the Stanford Achievement Test Primary II the i.t.a. group with kindergarten instruction exhibits a slightly higher mean level of performance than the T.O. group without kindergarten instruction for each category of intelligence. The differences are slightly over one point in favor of the i.t.a. group for the low and average categories of intelligence, and are slightly less than one point for the high category of intelligence. Nevertheless, Table 161 reveals that these small differences are significant at the .05 level of confidence. The computed F ratio of 3.91 was slightly higher than the required 3.86 for the .05 level of confidence for 1 and 497 degrees of freedom. Although this

## TABLE 160

## TABLE OF MEANS FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION ON THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | i.t.a. WK N=297 | T.O. WO/K N=206 |
|---|---|---|---|
| | Low | 40.40 | 38.89 |
| I.Q. | Average | 44.97 | 43.25 |
| | High | 50.33 | 49.44 |

## TABLE 161

## ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1967) AND THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1968) AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 4357.23 | 75.94** |
| Method | 1 | 224.47 | 3.91* |
| I.Q. x M | 2 | 7.36 | .13 |
| Error | 497 | 57.38 | |

*Significant at the .05 level of confidence
**Significant at the .01 level of confidence

difference is significant, the fact that it is just barely significant should be taken into consideration and we cannot have as much confidence in this difference as in most of the other differences observed through the tests of the other five hypotheses. The lack of a significant difference when comparing any i.t.a. group with a T.O. group in the area of Paragraph Meaning, and the other hypotheses, would tend to lessen our confidence in this barely significant difference. There is a significant difference for intelligence, as is found in all of these analyses of variance, with the difference among the intelligence categories being significant at well beyond the .01 level of confidence. Hence, we can confidently assume that there are significant differences among the categories of intelligence. Figure 85 visually represents the means for both the treatment groups by intelligence category. As can be seen, the lines are relatively parallel with the i.t.a. means slightly above that of the T.O. means. Minor variations observed in the slope of these lines does not suggest any strong interaction effect between intelligence and medium. This is confirmed in Table 161 as the computed F ratio for the interaction is .13 which does not approach significance. Hence, the minor variations in slope are likely due to chance factors.

In the area of Word Study Skills, in comparing the i.t.a. group with kindergarten instruction, and the T.O. group without kindergarten instruction, the means for the low intelligence category are 45.88 and 43.85, respectively; for the average category of intelligence, 51.91 and 48.13, respectively, and for the high category of intelligence, 56.21 and

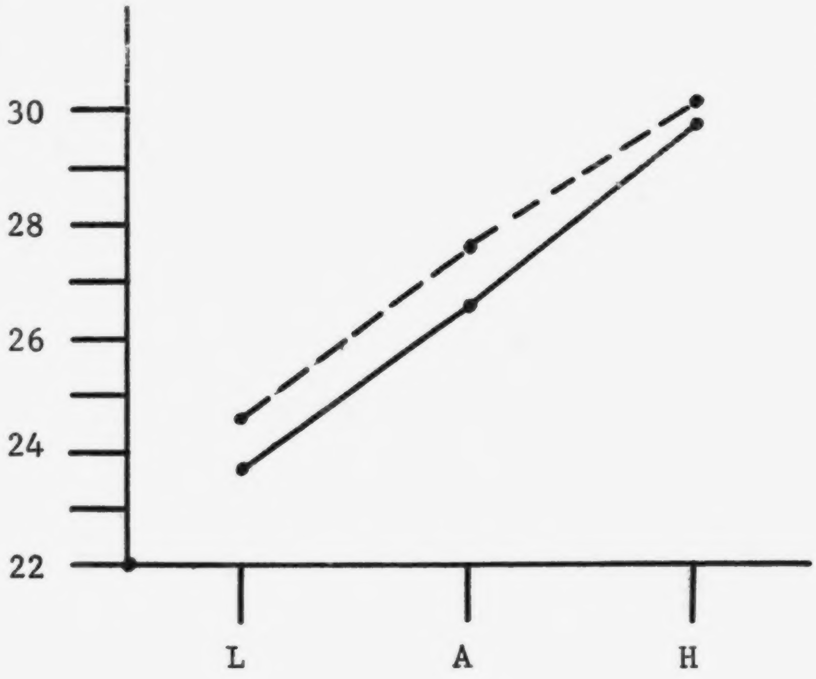

Figure 84

Relationship between Treatment and I.Q. on the Word Meaning Subtest of the Stanford Achievement Test, Primary II for the i.t.a. Group with Kindergarten Reading Instruction (1968) and the T.O. Group without Kindergarten Reading Instruction (1967) at the End of Third Grade

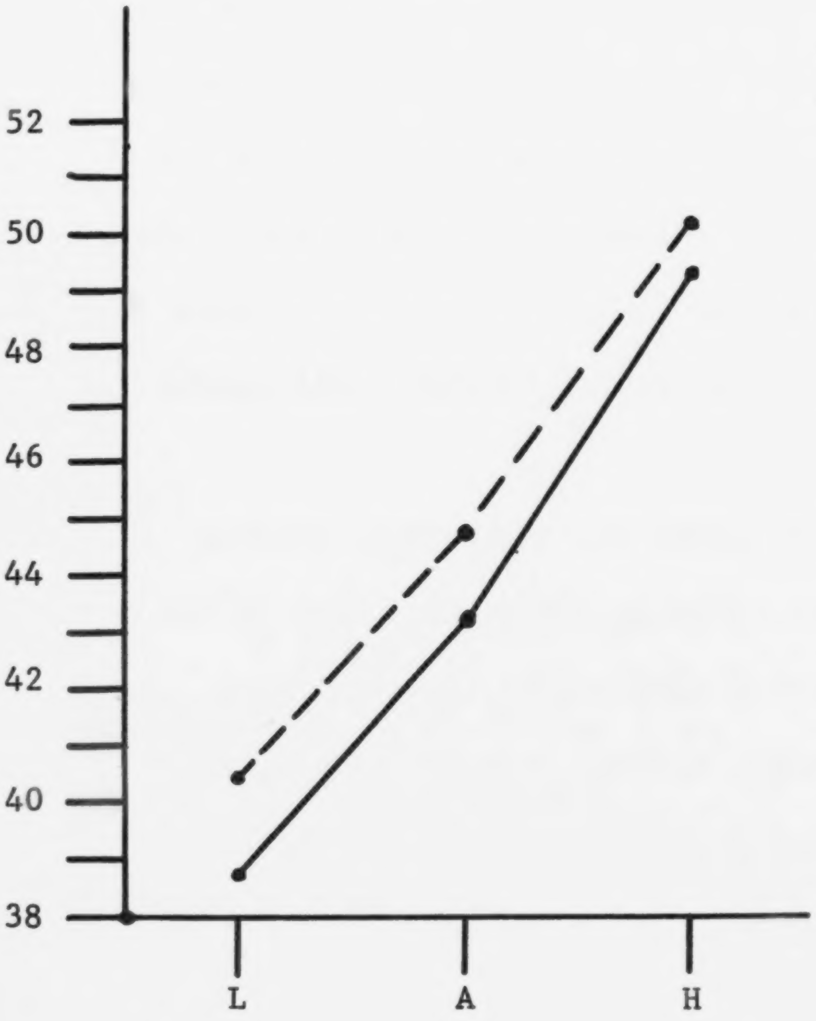

Figure 85

Relationship between Treatment and I.Q. on the Paragraph Meaning Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Group with Kindergarten Reading Instruction (1968) and the T.O. Group without Kindergarten Reading Instruction (1967) at the End of Third Grade

52.89, respectively. These differences are relatively high and are all in favor of the i.t.a. group with kindergarten instruction. Table 163 presents the computations for the analysis of variance for this subtest. The F ratio obtained of 13.27, significant at well beyond the .01 level of confidence for 1 and 497 degrees of freedom, strongly suggests the group instructed in i.t.a. is significantly superior in word analysis when compared to the group instructed in traditional orthography. The F ratio for intelligence is highly significant at well beyond the .01 level of confidence which suggests that the division of the groups by intelligence produces significant differences among the categories. Figure 86 which graphically represents comparison of means by intelligence category for the i.t.a. and T.O. groups, exhibits lines which are slightly diverging. It would appear that as intelligence increases, the superiority of the i.t.a. group over the T.O. group increases in word analysis. This suggestion of interaction is not confirmed in Table 163 as the F ratio for interaction was .41 which for 2 and 497 degrees of freedom is certainly not significant. Hence, the slight divergence observed in this case can be assumed to be the result of chance factors--not the result of any significant interaction between intelligence and medium of instruction.

In spelling achievement, the i.t.a. group who began their reading instruction at a pre-first-grade level was slightly higher than that of the T.O. group who began reading instruction at a first-grade level for each category of intelligence. These differences, however, are very small, with the largest difference being .73 of one point in the average intelligence

## TABLE 162

## TABLE OF MEANS FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION ON THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | i.t.a. WK N=297 | T.O. WO/K N=206 |
|---|---|---|---|
| | Low | 45.88 | 43.85 |
| I.Q. | Average | 51.91 | 48.13 |
| | High | 56.21 | 52.89 |

## TABLE 163

## ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1967) AND THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1968) AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 4069.03 | 50.09** |
| Method | 1 | 1077.77 | 13.27** |
| I.Q. x M | 2 | 33.58 | .41 |
| Error | 497 | 81.23 | |

**Significant at the .01 level of confidence

category. Table 165 reveals that these slight differences are not significant as the obtained F ratio of .61 is not significant for 1 and 497 degrees of freedom. Hence, there appears to be no difference in the spelling ability of the i.t.a. and T.O. groups. The computed F ratio of 12.41 for intelligence is significant beyond the .01 level of confidence, suggesting that there are differences among the categories of intelligence. Figure 87 graphically illustrates the means on the Spelling subtest by intelligence category for the two groups under discussion. As can be seen, the i.t.a. mean is slightly higher for each category of intelligence, and the lines are relatively parallel. The lack of observed interaction is statistically verified by the computation of an F ratio of .08, which for 2 and 497 degrees of freedom, is not significant.

In summary, it would appear that the i.t.a.-instructed group, whose instruction began at a pre-first-grade level, was significantly superior to that of the T.O. group who began their reading instruction at a first-grade level, in the area of word analysis or Word Study Skills. A very slight difference in favor of the i.t.a.-instructed group was also obtained in comprehension. This, however, is not confirmed in any of the other comparisons and, since this difference is just barely significant, it cannot be viewed with any strong degree of confidence. No difference was observed between the two groups in the areas of Word Meaning and Spelling.

## TABLE 164

### TABLE OF MEANS FOR THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION AND THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION ON THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Group Variables | | i.t.a. WK N=297 | T.O. WO/K N=206 |
|---|---|---|---|
| | Low | 22.35 | 22.02 |
| I.Q. | Average | 23.33 | 22.60 |
| | High | 25.41 | 25.19 |

## TABLE 165

### ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE T.O. GROUP WITHOUT KINDERGARTEN READING INSTRUCTION (1967) AND THE i.t.a. GROUP WITH KINDERGARTEN READING INSTRUCTION (1968) AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| I.Q. | 2 | 422.68 | 12.41** |
| Method | 1 | 20.86 | .61 |
| I.Q. x M | 2 | 2.82 | .08 |
| Error | 497 | 34.06 | |

**Significant at the .01 level of confidence

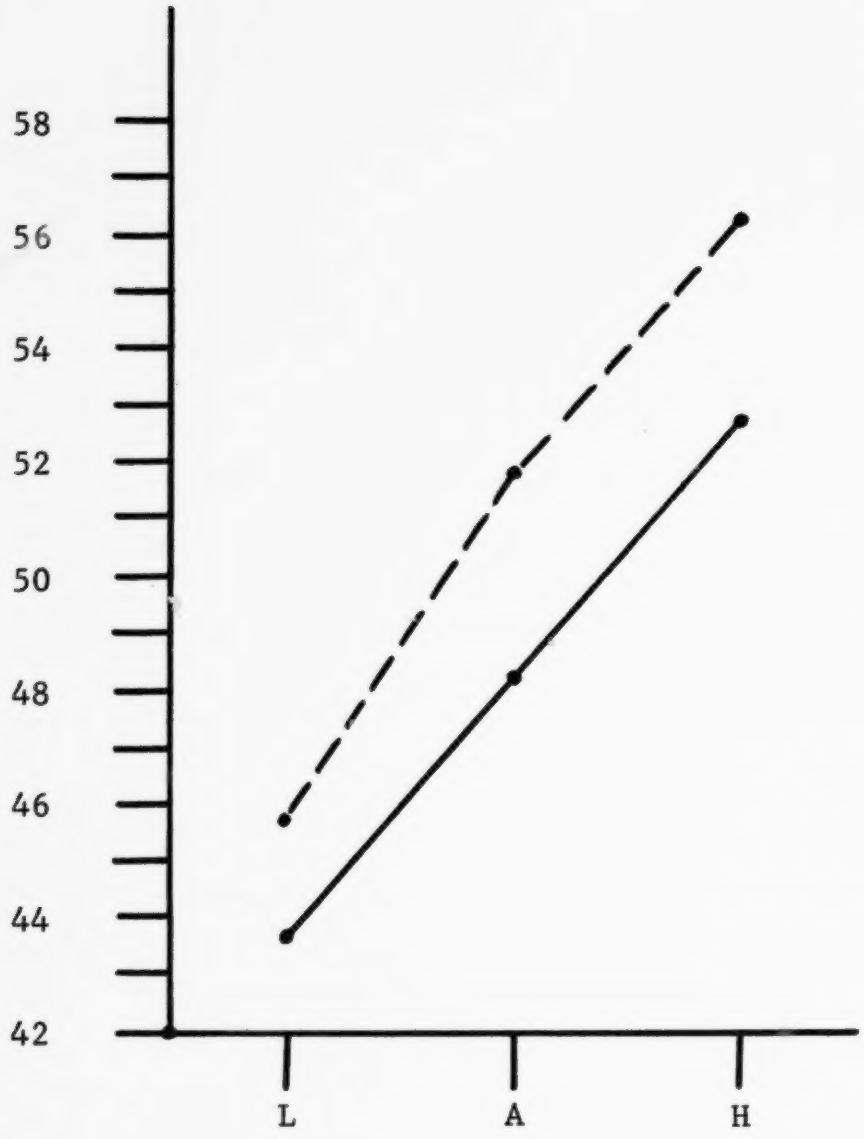

Figure 86

Relationship between Treatment and I.Q. on the Word Study Skills Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Group with Kindergarten Reading Instruction (1968) and the T.O. Group without Kindergarten Reading Instruction (1967) at the End of Third Grade

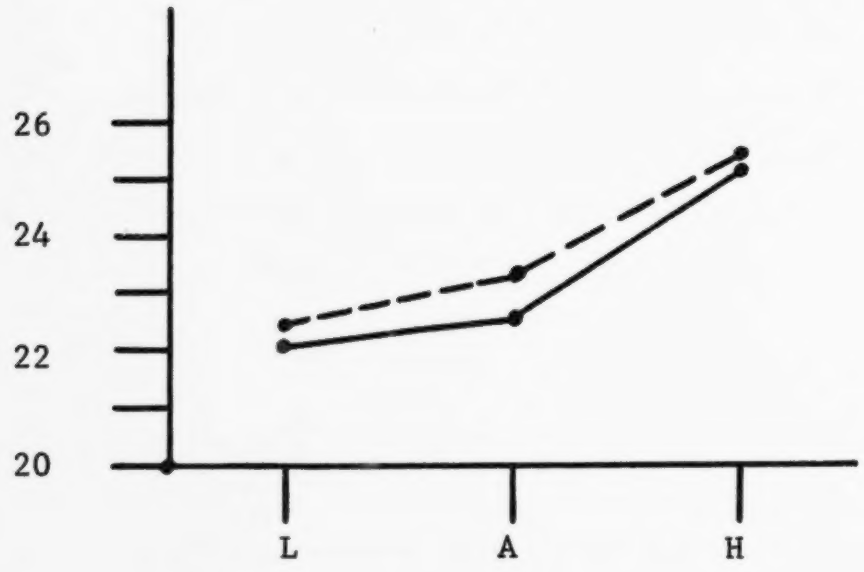

Figure 87

Relationship between Treatment and I.Q. on the Spelling Subtest of the Stanford Achievement Test, Primary II, for the i.t.a. Group with Kindergarten Reading Instruction (1968) and the T.O. Group without Kindergarten Reading Instruction (1967) at the End of Third Grade

# CHAPTER V

# SUMMARY AND CONCLUSIONS

1. When a formal reading program is introduced at the kindergarten level utilizing either i.t.a. or T.O. as the medium of instruction, the i.t.a. children were significantly superior in word recognition and the understanding of words, and in word analysis. These results were similar to those obtained when the two groups were measured at the end of first grade, with one exception. In the area of spelling, whereas the i.t.a.-taught children were significantly inferior to the T.O.-instructed children at the end of first grade, the i.t.a. group was significantly superior in spelling by the end of third grade. These findings suggest that children who are instructed in i.t.a. at the kindergarten level maintain their superiority in word recognition and word analysis over children who were initially instructed in reading at a kindergarten level utilizing the T.O. medium, but no advantage was found for either group in the area of comprehension in which the results were relatively similar for both groups.

2. The results for the i.t.a. and T.O. groups measured at the end of third grade who had not received kindergarten reading instruction were fairly similar with one modification. When instruction began at the first-grade level, children instructed in the i.t.a. medium were significantly better than their T.O. counterparts in Word Study Skills, but no significant differences were found in Word Meaning or Paragraph Meaning. Hence, it would appear that when reading instruction is begun at the kindergarten level

using i.t.a. as the medium of instruction better decoding skills will result; whereas, if reading is introduced at the first-grade level, children instructed in the i.t.a. medium will be superior in word analysis only. This is an additional confirmation of the fact that the more consistent medium will produce superior results in certain areas, specifically decoding, if the instruction begins at a pre-first-grade level and will likewise produce superior results if instruction begins at the first-grade level.

3. When a consistent medium of instruction such as i.t.a. is introduced on a formal basis to kindergarten children in reading instruction there is no difference in reading and spelling achievement over that obtained by children who begin formal reading instruction in first grade in i.t.a. when both groups are measured at the end of third grade. In general, there would appear to be no significant advantage in beginning reading instruction at the kindergarten level with children even if i.t.a. is utilized as the medium of instruction. There certainly may be individual children who benefited from early instruction in reading, but on an overall basis it certainly does not seem that this would be a desirable policy for a school system.

4. Introducing reading in traditional orthography to kindergarten children does not result in significantly better reading and spelling achievement than that obtained by children who are formally introduced to reading in T.O. in first grade when both groups are measured at the end of third grade. In general, the results on reading achievement of those children who began their reading instruction prior to first grade and those

who began in first grade were relatively similar for the Word Meaning, Word Study Skills and Paragraph Meaning subtests. Hence, again, it would not seem desirable to introduce reading on a universal basis at the kindergarten level, as no significant advantage accrues to the group beginning earlier, on a total basis. However, this does not deny the fact that there may be some individual children who benefited greatly by early reading instruction. It does certainly suggest that if a decision is made to begin reading instruction prior to first grade that this be done on an individual basis with a careful analysis made by the teacher, psychologist, and other administrators to determine the chances of the child's success.

5. When reading is introduced in i.t.a. to kindergarten children, this will result in significantly better word analysis and a slight superiority in comprehension over that obtained by children who are formally introduced to reading in first grade in T.O. when both groups are measured at the end of third grade. This would suggest that if reading instruction begins at a pre-first-grade level the chances for success are greater utilizing i.t.a. as the medium than utilizing T.O. as the medium, if the child's ability to decode words is a prime consideration. However, it should be remembered that introducing reading at the first-grade level in i.t.a. produces results which are relatively similar to when i.t.a. instruction is begun at the kindergarten level.

6. When formal reading instruction begins at the kindergarten level in T.O. it does not result in better reading and spelling achievement than introducing reading in i.t.a. at a first-grade level. In fact,

i.t.a. children who were instructed in reading for the first time at the first-grade level were significantly better than those children who began reading instruction at the kindergarten level in T.O. in the areas of word meaning and word study skills. i.t.a. children instructed initially at a first-grade level were also superior in spelling ability to children who began their reading instruction in traditional orthography at the kindergarten level.

In general the trends that seem confirmed in a number of areas are that i.t.a. produces significantly better reading achievement in the area of word study skills, or word analysis, and most of the time, in the area of word recognition and the understanding of words. Differences in the comprehension area were minor, although in the few cases in which a significant difference was found in this area, the difference was in favor of the i.t.a. group. Nevertheless, i.t.a. does not demonstrate clear superiority over traditional orthography as the medium of instruction in comprehension. The same general statement can be made in the area of spelling where the i.t.a. children were significantly superior to those taught in T.O., but this was not found consistently. It would appear that the i.t.a. children spell as well as T.O.-instructed children by the end of third grade even though in the initial year of this study it was found that at the end of first grade, T.O. children spelled significantly better than those instructed in i.t.a. In terms of the time at which instruction should begin it would seem rather evident from the results that no significant advantage accrues to a total group from beginning reading instruction on a universal basis prior to first grade. i.t.a. proved to be a superior medium of instruction regardless of the time at which instruction began. However, when one compares i.t.a. instruction beginning at a kindergarten level to that beginning at a first-grade level it would seem evident that no distinct advantage accrues to beginning i.t.a. instruction prior to first grade on a universal basis. The superiorities for the i.t.a. medium occurred generally in the area of decoding and are not consistently evident in the area of comprehension where T.O.-instructed children appear to do almost as well.

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# APPENDICES

# APPENDIX A

## SUMMARY AND CONCLUSIONS
## (1965-1966 REPORT)

An examination of the effect of medium of instruction (i.t.a. or T.O.) strongly suggests that the group of children instructed in the Initial Teaching Alphabet attained a significantly higher level of reading achievement than those groups instructed in traditional orthography. This was true whether reading was introduced on a formal basis at the kindergarten level or whether reading was initiated at the first-grade level on a formal basis. When both groups of children were introduced to reading at the kindergarten level, the group instructed in i.t.a. exhibited significantly higher achievement at the end of first grade in word recognition and in word study skills. The more striking of these two reading subtests was word recognition in which the i.t.a. group was significantly better than the group instructed in traditional orthography. In word study skills the superiority of the i.t.a. group was slightly significant (.05 level). For those groups of children who began reading instruction on a formal basis in first grade significant differences in reading achievement were not found at the end of first grade. By the end of second grade the i.t.a. group was significantly superior in word meaning and in word study skills, regardless of the time in which the reading was initiated on a formal basis. The comprehension, as measured by the paragraph meaning subtest of the Stanford Achievement Test, was relatively similar, as no significant differences were found. Hence, it would appear that the regularity of the Initial Teaching Alphabet does aid the child considerably in developing the word recognition skills. This improvement in word recognition, however, is not reflected in the child's ability to comprehend.

The effect of initiating formal reading instruction at the kindergarten level does not appear to be significant. This was true whether the kindergarten instruction was in the i.t.a. medium or in traditional orthography. When the two i.t.a. groups were compared no significant differences in achievement resulted between the i.t.a. group that had received formal reading instruction at the kindergarten level and the i.t.a. group that had not received instruction at the kindergarten level. Hence, it would appear that beginning formal reading instruction at the kindergarten level utilizing the i.t.a. medium is not advisable on an over-all basis. Despite this there were, of course, some children who began formal reading instruction at the kindergarten level who benefited greatly from this instruction. When traditional orthography is utilized as the medium of instruction and formal reading instruction begins at the kindergarten level the results are somewhat similar to those obtained between the i.t.a. group with kindergarten and without kindergarten instruction. Again, for those children who began formal reading in traditional orthography at the kindergarten level no significant change was discovered at the end of first grade when the reading achievement of this group was compared to that of a group of children who began reading instruction in traditional orthography at the first-grade level. This was true in both word reading and in word study skills. A slight significant difference (.05 level of confidence) was found for the paragraph meaning subtest, but in this case it was the group that had begun reading instruction at the first-grade level on a formal basis whose achievement was significantly higher. Hence, as was true for the i.t.a. group, initiating formal reading instruction at the kindergarten level does not seem to produce beneficial results in terms of reading achievement at the conclusion of first grade.

Beginning reading instruction on a formal basis at the kindergarten level utilizing i.t.a. as the medium produced significantly higher achievement in word recognition by the end of first grade than that attained by the group instructed in T.O. for whom formal reading instruction began in first grade. The comprehension and word study skills subtest for these two groups suggest that the comprehension and word analysis was relatively similar. When reading instruction is begun at a kindergarten level in T.O. and reading instruction is begun in i.t.a. at the first-grade level children instructed in i.t.a. were significantly better in word recognition and analysis, but not in comprehension.

Again, the data suggest that instructing children in the i.t.a. medium produces better word recognition and word analysis, regardless of the time at which reading instruction is initiated. Initiating reading instruction at a kindergarten level, however, does not produce significantly better achievement whether the instruction takes place in the Initial Teaching Alphabet or in traditional orthography. The results seem to indicate that although reading can be taught successfully to five-year-olds the proportion of children who achieve some degree of success in reading is extremely small. For those children who are instructed in traditional orthography at the kindergarten level, only 2 percent of the children were reading at a primer level. None of the children who were instructed in T.O. were reading at levels higher than primer. Although more children in the five-year-old age group achieved some degree of reading success when instructed in the Initial Teaching Alphabet, the percentage of unsuccessful readers was still quite small; only 3 percent of the i.t.a. children were reported by their teachers as reading at a first-reader level or higher at the conclusion of kindergarten. Thus, it would appear that the i.t.a. materials were easier for children at the kindergarten level and more of the children achieved reading success than was true in traditional orthography, but in both cases the proportion of children who were reading successfully at primer levels or higher was so small that the desirability of initiating reading instruction at the kindergarten level is strongly subject to doubt. This is further verified by the fact that at the end of first grade no significant differences were found in favor of those children who had begun reading instruction at age five rather than at the normal age, six.

In the area of spelling achievement somewhat similar results were found in relation to the time at which reading instruction was initiated. Initiating reading at the kindergarten level did not produce significantly better spelling for the group that began reading instruction in i.t.a. at the kindergarten level as compared to groups instructed in i.t.a. in reading for the first time in first grade, and the same was true in traditional orthography. There is no question, however, that at the conclusion of first grade children instructed in traditional orthography spell significantly better than those children who are instructed in the Initial Teaching Alphabet. Despite the superiority of the traditional orthography instructed children at the end of first grade it was found that at the end of second grade those children instructed in the Initial Teaching Alphabet were spelling at a level significantly higher than those children instructed in traditional orthography. This suggests, then, that after all children had made the transition to traditional orthography and had been instructed in it for a period of time, they not only reach, but exceed the achievement of those children instructed in traditional orthography. Why this occurs is subject to further investigation. One tentative hypothesis is that when a child is instructed in a regular medium first, he is more attentive to the irregularities and variations of our orthographic system than if he is instructed in traditional orthography, where he becomes somewhat accepting of variations in the possible spelling of sounds. He is, therefore, not particularly attentive to the possible variations.

As determined from the analysis of variance, intelligence would not seem to be a major factor in determining whether the i.t.a. or the T.O. medium would be more effective for instruction. It was generally true that children instructed in the Initial Teaching Alphabet were significantly better in word recognition and word analysis at all levels of intelligence. Thus, it would not appear that intelligence should be a major determinant in deciding upon the medium of instruction for a child in beginning reading. It may be concluded, therefore, that:

1. Introducing a consistent medium such as i.t.a. to kindergarten children in a formal reading program does result in significantly better word recognition and word analysis than that attained by children who learn in traditional orthography in kindergarten when both groups of children are measured at the end of first grade.
2. Introducing a consistent medium such as i.t.a. to kindergarten children in a formal reading program does not result in significantly better comprehension and does result in significantly poorer spelling achievement than that attained by children who learned in traditional orthography in kindergarten when both groups are measured at the end of first grade.
3. Introducing a consistent medium such as i.t.a. to kindergarten children does not result in significantly better reading and spelling achievement than that attained by children who begin

formal reading instruction in first grade in i.t.a. when both groups are measured at the end of first grade.

4. Introducing reading in traditional orthography to kindergarten children does not result in significantly better reading and spelling achievement than that attained by children who are formally introduced to reading in traditional orthography in first grade when both groups are measured at the end of first grade. In actual fact, the group that had not received kindergarten reading instruction was significantly higher in comprehension achievement than the group that had received kindergarten instruction in traditional orthography.
5. Introducing reading in i.t.a. to kindergarten children results in significantly higher word recognition than that attained by children who are formally introduced to reading in first grade in T.O. when both groups are measured at the end of first grade.
6. Introducing reading in i.t.a. to kindergarten children does not result in significantly better comprehension or word analysis than that attained by children introduced to reading in first grade in T.O.
7. Introducing reading in i.t.a. to kindergarten children results in significantly poorer spelling achievement than that attained by children formally introduced to reading in first grade in T.O.
8. Introducing i.t.a. to first-grade children results in significantly better word recognition and word analysis than that attained by children who begin formal reading in kindergarten in T.O. when both groups are measured at the end of first grade.

9. Introducing i.t.a. to first-grade children does not result in better comprehension than that attained by children who begin formal reading in kindergarten in traditional orthography. The spelling achievement of children who begin formal reading instruction in kindergarten in traditional orthography is significantly better than the spelling achievement of children introduced to reading for the first time in first grade in i.t.a.

10. Introducing reading instruction to first-grade children in i.t.a. does result in significantly better word meaning and word study skills than that attained by children who begin reading instruction in first grade in traditional orthography when both groups are measured at the end of second grade.

11. Introducing reading instruction to first-grade children in i.t.a. does not result in significantly better comprehension than that attained by children who begin reading instruction in first grade in traditional orthography when both groups are measured at the end of second grade.

To summarize these results, it would appear that i.t.a. is a more effective medium in developing word recognition and word analysis skills. Comprehension does not seem to be affected by the medium of instruction. There is also a strong suggestion that formal reading instruction should not begin at a formal basis at the kindergarten level with all children, and that the present practice of initiating formal reading instruction at first grade is prefered. If reading instruction is introduced at the kindergarten level, this should be done on the basis of selecting those few children for whom the chances of success are greatest.

## APPENDIX B

### ANALYSIS OF VARIANCE TABLE FOR THE COMPOSITE READING SCORE OF THE STANFORD ACHIEVEMENT TEST, FOR THE FIRST-GRADE i.t.a. AND T.O. GROUPS, 1964-1965

| SOURCE | DF | SS | MS |
|---|---|---|---|
| Total | 101 | 536.7031 | |
| I | 2 | 322.8331 | 161.4166 |
| M | 1 | 1.5564 | 1.5564 |
| C/M | 32 | 128.0267 | 4.0008 |
| MI | 2 | 1.1124 | 0.5562 |
| IC/M | 64 | 83.1745 | 1.2996 |

### ANALYSIS OF VARIANCE TABLE FOR THE COMPOSITE READING SCORE (WORD MEANING, PARAGRAPH MEANING, WORD STUDY SKILLS, AND SPELLING) OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, FOR THE SECOND-GRADE i.t.a. AND T.O. GROUPS, 1965-1966

| SOURCE | REDUCED SUM OF SQUARE | df | MEAN SQUARE | F |
|---|---|---|---|---|
| Grand Mean | 7454.51 | 1 | 7454.51 | |
| I.Q. | 126.48 | 2 | 63.24 | |
| Methods | 9.15 | 1 | 9.15 | 4.07 |
| I.Q. x Method | 4.35 | 2 | 2.17 | |
| Group/Method | 54.12 | 24 | 2.25 | |
| I.Q. x Group/Method | 84.39 | 48 | 1.76 | |

## APPENDIX C

## DETROIT WORD RECOGNITION TEST SCORES OF THE FIRST-GRADE i.t.a. AND T.O. POPULATIONS MARCH 1966

| | Frequency | | | | Percent of Pupils Scoring At/Or Higher Than Class Interval | | | |
|---|---|---|---|---|---|---|---|---|
| | i.t.a. | | T.O. | | i.t.a. | | T.O. | |
| Class Intervals | 1964-65 N=409 | 1965-66 N=398 | 1964-65 N=407 | 1965-66 N=330 | 1964-65 | 1965-66 | 1964-65 | 1965-66 |
| 36-40 | 196 | 248 | 114 | 116 | 48 | 62 | 28 | 35 |
| 31-35 | 51 | 50 | 53 | 32 | 60 | 75 | 42 | 45 |
| 26-30 | 41 | 35 | 43 | 39 | 70 | 84 | 52 | 57 |
| 21-25 | 40 | 24 | 40 | 41 | 80 | 90 | 61 | 69 |
| 16-20 | 34 | 15 | 44 | 25 | 89 | 93 | 72 | 77 |
| 11-15 | 22 | 10 | 42 | 31 | 94 | 96 | 83 | 86 |
| 6-10 | 13 | 9 | 47 | 29 | 97 | 98 | 94 | 95 |
| 1-5 | 10 | 6 | 23 | 13 | 99 | 99 | 99 | 99 |
| 0 | 2 | 1 | 1 | 4 | 100 | 100 | 100 | 100 |

## APPENDIX D

### DISTRIBUTION OF KINDERGARTEN AND FIRST-GRADE i.t.a. AND T.O. POPULATIONS BY DISTRICT AND SCHOOL, 1964-65

| | | i.t.a. Classes (N=40) | | | | T.O. Classes (N=38) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Number of Pupils | | | | Number of Pupils | | | |
| | | Kgn. | | Gr. 1 | | Kgn. | | Gr. 1 | |
| DISTRICT (N=11) | SCHOOL (N=19) | 9/64 N=602 | 6/65 N=570 | 9/64 N=442 | 6/65 N=404 | 9/64 N=556 | 6/65 N=535 | 9/64 N=435 | 6/65 N=406 |
| EAST MEADOW | Bowling Green | 31 | 29 | 29 | 26 | 29 | 28 | 29 | 27 |
| | | 30 | 28 | 28 | 26 | 31* | 31 | 28 | 25 |
| | | 30* | 28 | | | 30 | 29 | | |
| | | 31* | 29 | | | 32* | 32 | | |
| | Meadowbrook | 31 | 31 | | | 32 | 33 | | |
| | | 31* | 31 | | | 32* | 32 | | |
| HEWLETT/WOODMERE | Woodmere Elem. | 20 | 20 | 22 | 18 | | | 21 | 20 |
| | | 18* | 16 | | | | | | |
| ISLAND PARK | Audubon Elem. | 26 | 25 | 24 | 22 | 25 | 26 | 23 | 24 |
| | | 26* | 27 | | | 26* | 25 | | |
| | Radcliffe Rd. | | | 24 | 23 | | | 25 | 19 |
| LAWRENCE | #5 School | | | 27 | 27 | | | 26 | 25 |
| | #6 School | | | 27 | 27 | | | 26 | 26 |
| LOCUST VALLEY | L.V. Primary | 27 | 26 | 24 | 22 | 30 | 24 | 24 | 22 |
| | | 28* | 26 | | | 26* | 26 | | |
| PLAINVIEW | Oak Drive | 24 | 23 | 27 | 25 | | | 26 | 25 |
| | | 23* | 21 | 26 | 25 | | | 25 | 23 |
| | Joyce Rd. | | | | | 23* | 22 | | |
| | | | | | | 23* | 21 | | |
| ROCKVILLE CENTRE | Morris School | 20 | 22 | 28 | 23 | 20 | 17 | 28 | 22 |
| | | 19* | 18 | | | 19* | 17 | | |
| SEAFORD | Seaford Ave. | 30 | 28 | 28 | 19 | | | | |
| | | 29* | 29 | 28 | 23 | | | | |
| | Seaford Harbor | | | | | 34 | 30 | | |
| | | | | | | 31* | 29 | | |
| | Jackson Avenue | | | | | | | 27 | 27 |
| | Seaford Manor | | | | | | | 26 | 25 |
| SOUTH HUNTINGTON | Central Elem. | 34 | 26 | 26 | 26 | 30 | 18 | 26 | 26 |
| | | 26* | 30 | 26 | 25 | 24* | 33 | 26 | 25 |
| VALLEY STREAM 13 | Corona Avenue | 26 | 24 | 25 | 24 | 26 | 26 | 24 | 23 |
| VALLEY STREAM 24 | Harbor Rd. | 22 | 16 | | | 22 | 18 | | |
| | | 20* | 18 | | | 21* | 18 | | |
| | Wm. L. Buck | | | 23 | 23 | | | 25 | 22 |

*Afternoon Sessions

# APPENDIX E

## DESCRIPTION OF THE SAMPLE: COMMUNITY INFORMATION

## (1965-1966 REPORT)

In order to evaluate the data accurately it is important to understand the communities from which the sample is drawn and also the type of teachers employed in these districts, since the Long Island area is not typical of the rest of New York State.

### Median number of years of education of adults*

There were nineteen schools taken from eleven school districts represented in the study. There were variations among the schools within the district as to median number of years of education completed by adults. This report was done by individual schools rather than total district.

The median number of years of education completed by adults living in the community for one school was ten years, for five schools it was eleven years, for twelve schools it was twelve years, and for one school it was thirteen years. The median, therefore, for all schools was twelve years, which is higher than the median for New York State. Hence, the parents of children represented in this study had received more formal education than would be typical of the national or state population.

### Median income of parents*

Of the nineteen schools represented in the study, in three schools parents had a median income between seven and eight thousand dollars and in four schools parents had a median income of nine thousand dollars plus. The median for the total sample was, therefore, eight to nine thousand dollars.

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*1960 U.S. Census

Hence, the parents of the children in the study were more affluent than would be typical of parents in general in the state or nation.

### Population of the communities*

Three of the nineteen schools were located in communities having populations between 2501 and 5000. Three of the schools were located in areas where the population is 5001 to 10,000, six of the schools were located where the population was 10,001 to 25,000, and seven schools were in areas where the population was 25,001 to 100,000. The median population fell in the class interval 10,001 to 25,000.

### Types of communities

One community in which these schools were located could be classified as urban, seventeen communities as suburban, and one as an incorporated village of less than 2500 population.

### Length of school day

Of the nineteen schools cooperating in the study seven of the schools had a school day that was 4.6 to 5.0 hours in length, six had a school day of 5.1 to 5.5 hours, five had a school day of 5.6 to 6.0 hours, and one was 6.1 to 6.5 hours. This time variable was controlled by having i.t.a. and T.O. classes within each of the districts involved in the study, hence, when only one school was involved, having a school day as long as 6.1 to 6.5 hours, this particular school would have both i.t.a. and T.O. classes in it.

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*1960 U.S. Census

## Length of school year

In terms of the length of the school year, there were very minor variations among the nineteen schools. One school had a school year of 180 days. Eleven, or the majority of the schools, had a school year ranging from 181 to 185 days, and seven schools had a school year that ranged in length from 186 to 190 days.

## Number of first-grade classrooms

Some idea of the size of the schools involved in the study can be obtained from the information on the number of first-grade rooms in the building. Eleven, or over half the schools involved in the study, had three to four classrooms assigned to first grade within the building. Only one school had as many as nine rooms, and only three more than six first-grade rooms within the building. Hence, most of the schools within this study are not overly large in size.

Three of the school districts had six to ten first-grade rooms, four of the school districts had between eleven and twenty first-grade classrooms, three school districts had twenty-one to thirty first-grade classrooms, and one school district had from thirty-one to forty first-grade classrooms. Hence, most of the districts involved in the study were fairly small.

## Number of second-grade classrooms

As would be expected, the number of second-grade classrooms in each school district was similar to the number of first-grade classrooms in each school district. Three of the school districts had from one to ten second-grade classrooms, four districts had eleven to twenty classrooms, two districts had from twenty-one to thirty second-grade classrooms, one district had from thirty-one to forty classrooms, and one school district had from forty-one to fifty classrooms.

## APPENDIX F

## DESCRIPTION OF THE SAMPLE: TEACHER INFORMATION

Teachers were selected by the principals according to present criteria and were later randomly assigned to T.O. or i.t.a. groups in second-grade. It would be assumed that teachers in i.t.a. classes and T.O. classes would be relatively similar in terms of age, type of teaching certificate and number of years of teaching experience (total and in grade). Data are not presented for the third-grade teachers since the teacher was not a variable at that stage of the study inasmuch as each teacher had children from both treatment groups in her class.

### Age

The average age of i.t.a. teachers was 34.6 years and the average age of T.O. teachers was 36.3 years. There is no significant difference between the two groups of teachers in age. The average age of third-grade teachers was 39.5 years.

### Degrees

Table A illustrates the degrees held by first-, second- and third-grade teachers for 1966-67--each of the two groups for second grade and for the combined groups in third grade.

As can be seen in Table A, none of the i.t.a. teachers possess less than a B.A. while one of the T.O. teachers does not possess a bachelor's degree. Twenty-three of the twenty-four i.t.a. teachers had credits beyond a bachelor's degree while sixteen of the nineteen T.O. teachers had credits beyond a bachelor's degree. Among the third-grade teachers, only two had not received a bachelor's degree while forty-four of the forty-eight teachers had credits beyond the bachelor's degree.

TABLE A

DISTRIBUTION OF DEGREES HELD BY FIRST- AND SECOND-GRADE i.t.a. AND T.O. TEACHERS AND THIRD-GRADE TEACHERS

| | First Grade | | Second Grade | | Third Grade | Third Grade |
|---|---|---|---|---|---|---|
| | i.t.a. | T.O. | i.t.a. | T.O. | 1967 | 1968 |
| Less than B.A. | | | | 1 | 2 | |
| B.A. | | | 1 | 2 | 2 | |
| More than B.A. | 12 | 11 | 13 | 12 | 31 | 39 |
| M.A. | 2 | 2 | 1 | 1 | 5 | 2 |
| More than M.A. | 8 | 8 | 9 | 3 | 8 | 15 |
| Professional Degree | | | | | | 1 |
| | N=22 | N=21 | N=24 | N=19 | N=48 | N=57 |

In summary, all of the i.t.a. second-grade teachers had a bachelor's degree or beyond, in terms of training, while eighteen of the nineteen T.O. second-grade teachers had a bachelor's degree, or more, in training. For the third-grade teachers, forty-six of the forty-eight teachers possessed a bachelor's degree or had received training beyond it.

## Certification

Table B represents the distribution of certificates held by second- and third-grade teachers in the study. As can be seen in the table, twenty-three of the twenty-four i.t.a. teachers possessed the standard certificate, or higher, with only one teacher possessing a substandard certification; i.e., provisional. All of the T.O. second-grade teachers possess standard certification or higher. Among the third-grade teachers, forty-six of the forty-eight teachers possessed the standard certificate or better. Only two teachers are, at present, uncertified. Hence, only three teachers in second and third grade did not possess the standard certificate for teaching in New York State.

TABLE B

DISTRIBUTION OF CERTIFICATES HELD BY FIRST- AND SECOND-GRADE i.t.a. AND T.O. TEACHERS AND THIRD-GRADE TEACHERS

| | First Grade | | Second Grade | | Third Grade | Third Grade |
|---|---|---|---|---|---|---|
| | i.t.a. | T.O. | i.t.a. | T.O. | 1967 | 1968 |
| Uncertified | | | | | 2 | |
| Substandard | | | 1 | | | 2 |
| Temporary | | | | | | 1 |
| Standard | 22 | 16 | 17 | 11 | 23 | |
| Higher than Standard | | 5 | 4 | 4 | 17 | |
| Early Childhood | | | | | | 2 |
| Common Branches | | | 2 | 4 | 6 | 52 |
| | N=22 | N=21 | N=24 | N=19 | N=48 | N=57 |

## Marital Status

In examining the marital status of the teachers in the sample in both second and third grades the following information was obtained and is illustrated in Table C.

## TABLE C

## MARITAL STATUS OF TEACHERS

| | First Grade<br>i.t.a. | <br>T.O. | Second Grade<br>i.t.a. | <br>T.O. | Third Grade<br>1967 |
|---|---|---|---|---|---|
| Single | 9 | 4 | 12 | 4 | 9 |
| Married | 13 | 17 | 12 | 14 | 36 |
| Widowed or Divorced | | | | 1 | 3 |
| | N=22 | N=21 | N=24 | N=19 | N=48 |

The following figures present data concerning the teaching experience of the first- and second-grade teachers.

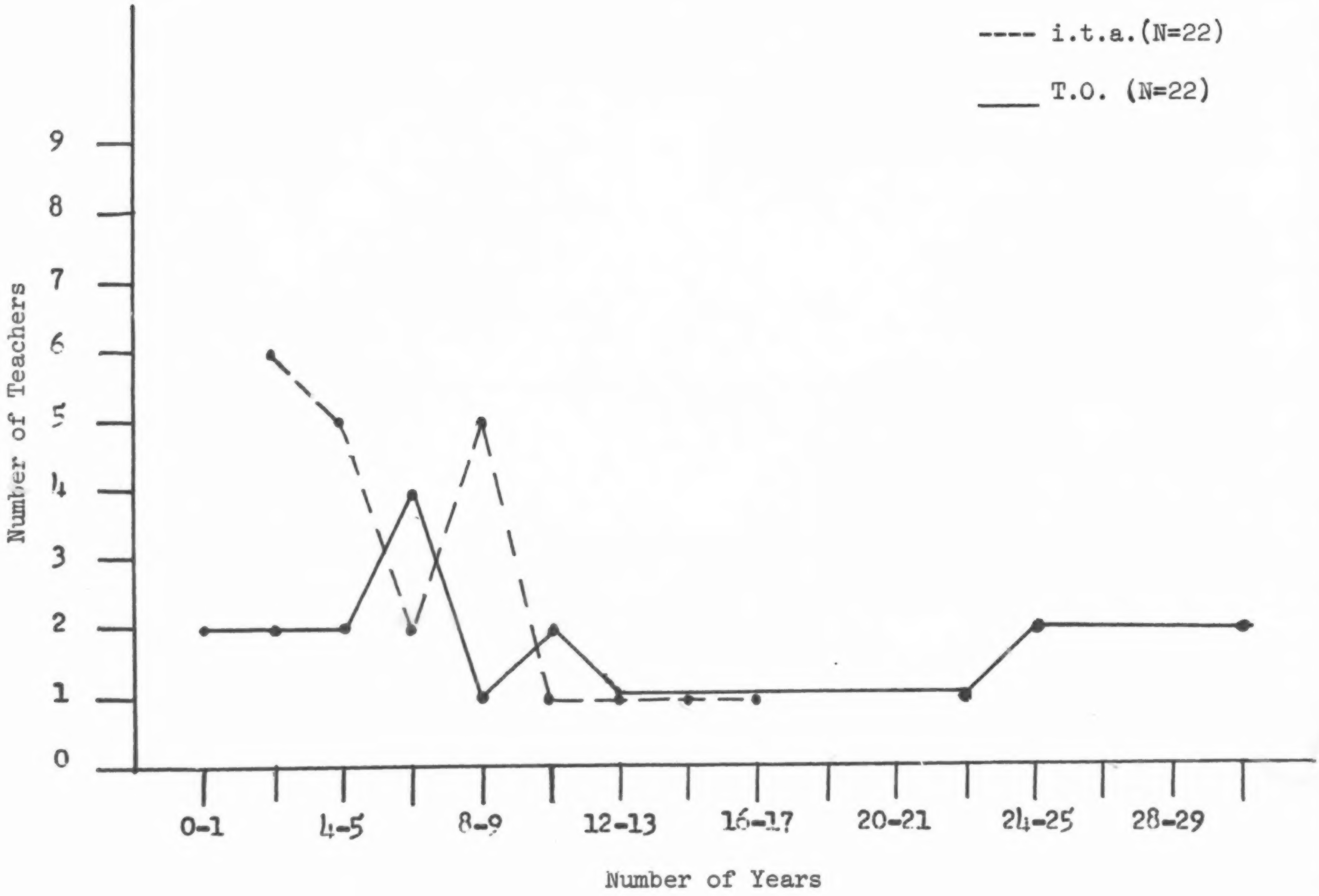


Figure A Total Teaching Experience of First-Grade i.t.a. and T.O. Teachers

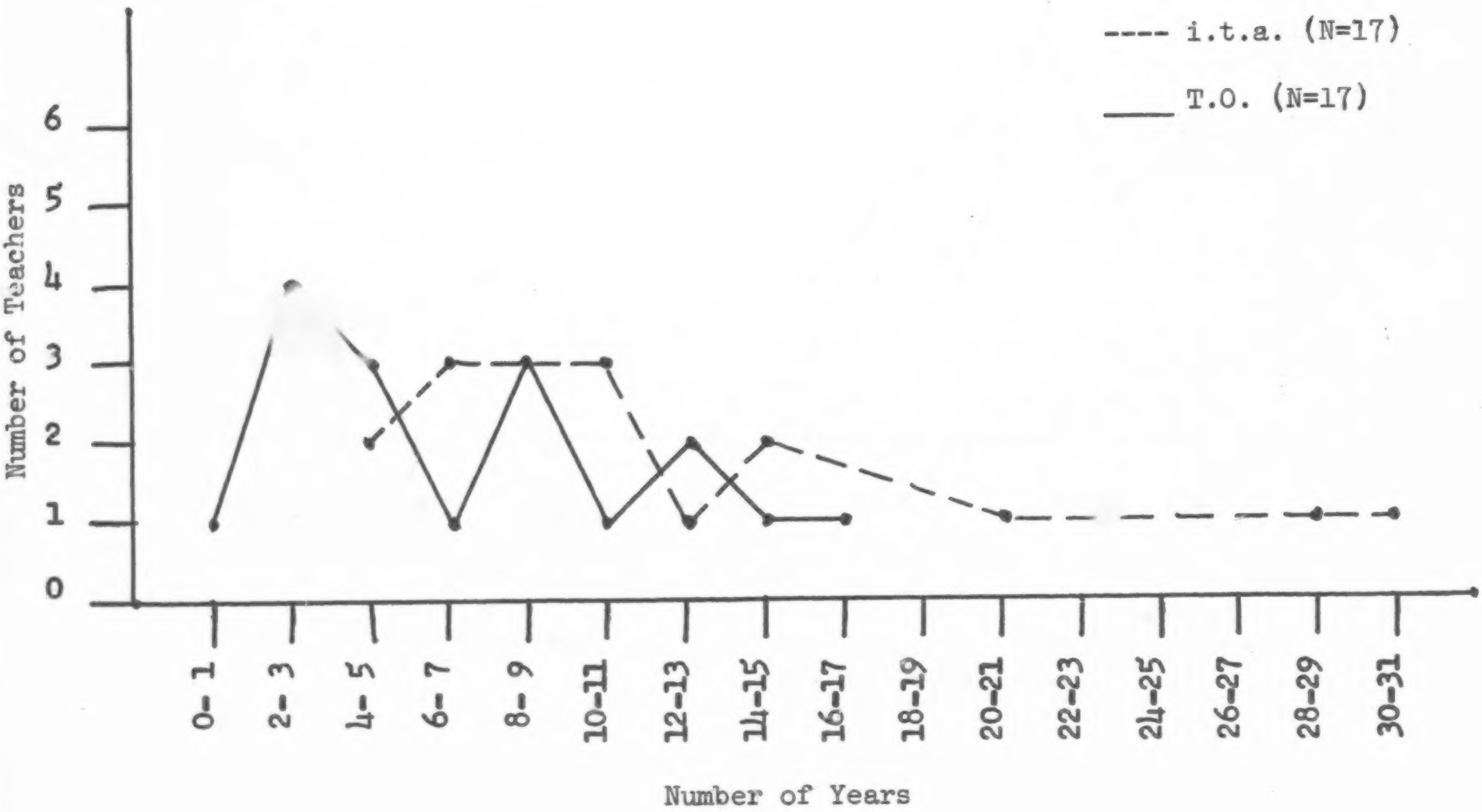


Figure B Total Teaching Experience of Second-Grade Teachers

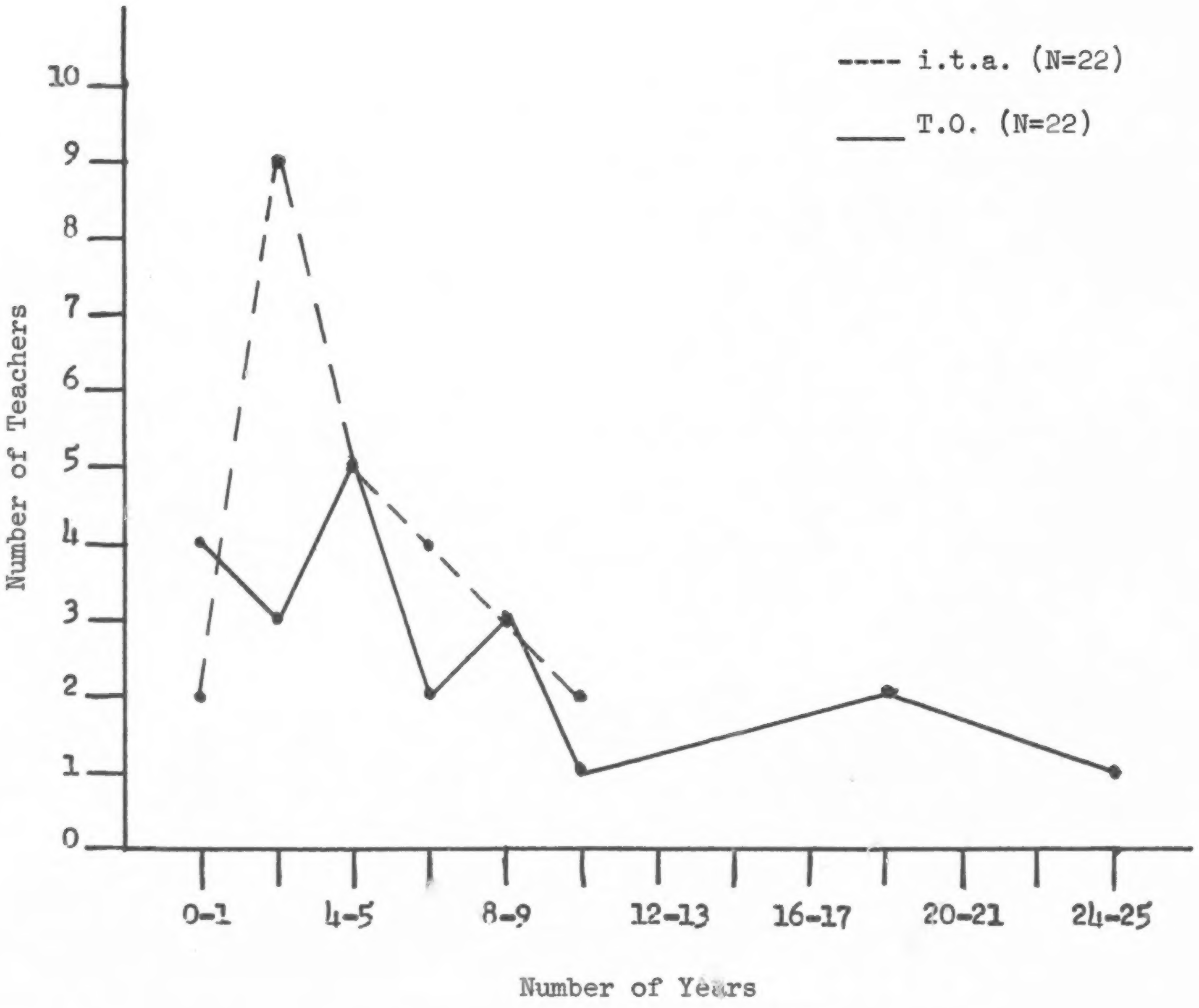


Figure C Number of Years of First-Grade Teaching Experience of First-Grade Teachers

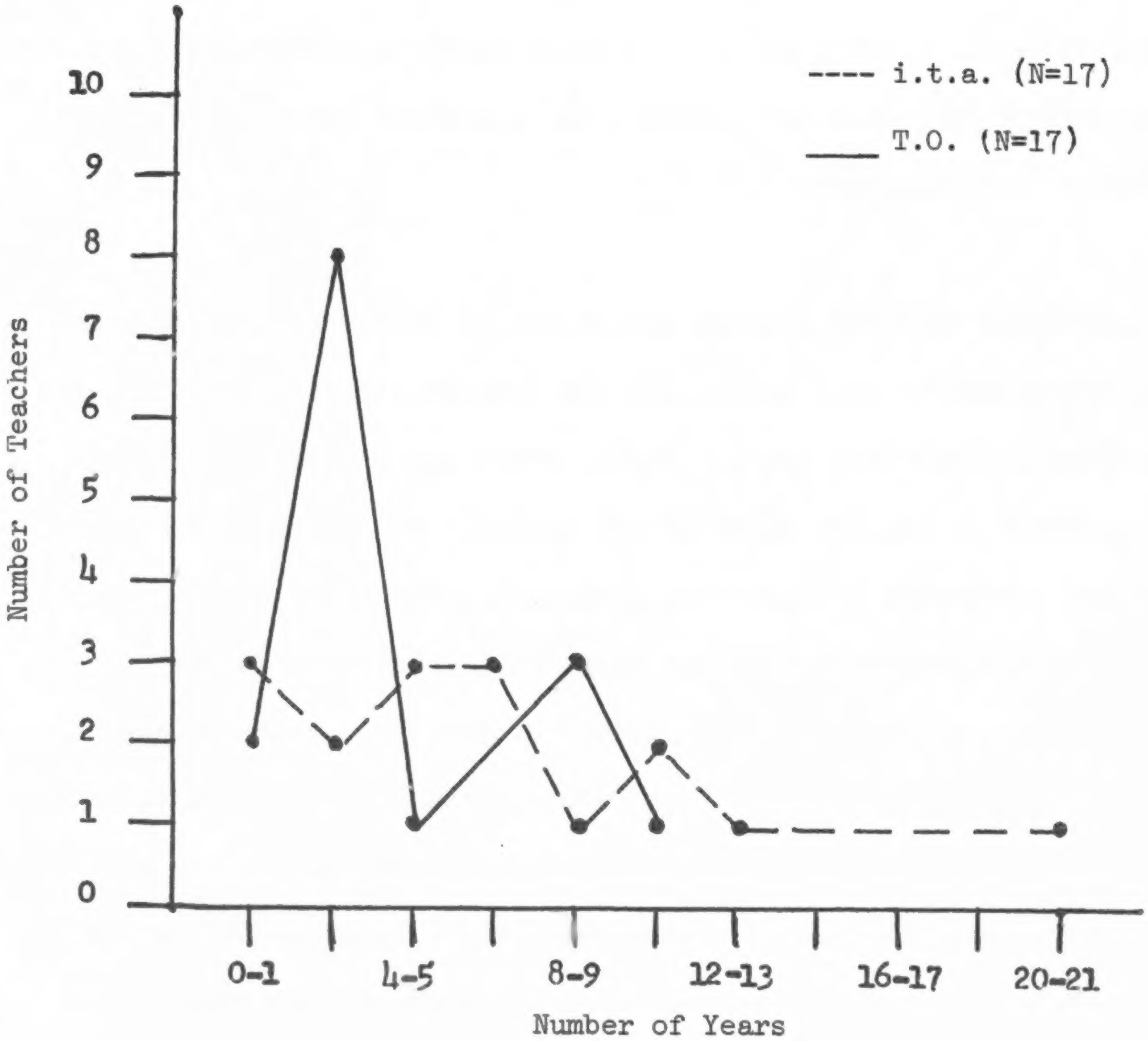


Figure D Number of Years of Second-Grade Teaching Experience of Second-Grade Teachers

## APPENDIX G

## DESCRIPTION OF THE SAMPLE: TEACHER INFORMATION

## (1965-1966 REPORT)

Teachers were selected by the principals according to present criteria and were later randomly assigned to T.O. or i.t.a. groups. It would be assumed that teachers in i.t.a. classes and T.O. classes would be relatively similar in terms of age, type of teaching certificate, and number of years of teaching experience (total and in grade).

### Age

It was found that the average age of i.t.a. first- and second-grade teachers was approximately 34.3 years, and the average age of T.O. first- and second-grade teachers was 40.5 years. Hence, there was a difference in age between the teachers in the two experimental groups. To determine the significance of the difference a t-test was performed between the means. This revealed that the difference between the means was significant at the .05 level of confidence. The range of ages in i.t.a. was 24-53 years of age, whereas in T.O. the range was 22-59. The mean for the T.O. group in this case was inflated by two extreme scores. Despite that, the medians of the two groups still indicated a difference in age, with the T.O. group having the higher median than the i.t.a. group. In the first-grade groups none of the teachers had less than a bachelor's degree. Twelve of the i.t.a. teachers and eleven of the T.O. teachers reported a bachelor's degree plus some credits, but less than a master's degree. Two teachers in each group reported the master's degree and eight teachers in each group reported the master's degree plus additional credits. Hence, the groups were virtually identical in degrees held. For the second-grade teachers in the sample none of the i.t.a. and one of the T.O. teachers reported the bachelor's degree plus no credits, eleven teachers in each group reported the bachelor's plus some credits (but less than an M.A.), one teacher in each group reported an M.A., six teachers in i.t.a. and four teachers in the T.O. groups reported a master's degree plus some credits. Again, there was considerable similarity among the groups in degrees held. The medians for the first-grade teachers and the second-grade teachers were approximately equivalent. Hence, it would appear that there was no advantage in training for either of the two experimental groups at the first- or second-grade levels.

Certification

Every teacher in the study possessed the appropriate certificate for the grade or grades taught. For the i.t.a. first-grade teachers twenty-two possessed the common branch or early childhood certificate and none possessed any additional certification. For the T.O. first-grade groups sixteen teachers reported the standard common branch or early childhood certificate, five possessed other certificates that would require training beyond those necessary for the standard certificates.

Among the second-grade teachers fourteen of the i.t.a. teachers possessed the standard certificate, and thirteen of the T.O. teachers held the standard certificate. Two of the i.t.a. teachers reported certificates higher than the normal standard certificate, and four of the T.O. teachers reported a higher than standard certificate. One of the i.t.a. teachers reported near completion of a higher than standard certificate. In terms of the certification held by teachers (which also reflects their training, specifically in the area of education) it would appear that among the first-grade teachers those teaching traditional orthography had a slightly higher level of attainment than those in the i.t.a. classes. Among the second-grade teachers certification held was approximately equivalent.

Number of years of teaching experience: first- and second-grade 1966 teachers

For i.t.a. first-grade teachers the median number of years of teaching experience was 6.5 years, while for the T.O. teachers, the median was 9.0 years. The range of experience was quite different for both groups, with i.t.a. teachers ranging from two to seventeen years of experience, while the T.O. teachers ranged from zero to over thirty years of experience. Because of the five extreme scores in the T.O. groups there is a considerable difference between the means (which are respectively 6.68 and 12.7 years of teaching experience) for first-grade i.t.a. and first-grade T.O. teachers. This difference was significant at beyond the .01 level of confidence. Hence, it would appear that T.O. teachers had greater experience in teaching than the i.t.a. teachers in the first-grade classrooms. Among the second-grade teachers in the 1966 sample the means for i.t.a. and T.O. teachers respectively (in terms of the total number of years of teaching experience) were 11.9 and 7.2. This difference was also significant at beyond the .05 level of confidence. The range of teaching experience for i.t.a. teachers was two years to over thirty years; while for T.O. teachers the range was zero to seventeen years. Because of the extreme scores of the i.t.a. group of teachers medians were calculated. Medians for the i.t.a. and T.O. second-grade teachers respectively were 7.0 and 5.0. This reflects considerably more similarity than was evident in the means. Nevertheless, it would appear that among the second-grade teachers those teaching in traditional orthography had slightly more experience than those teaching i.t.a.

The range of experience for i.t.a. teachers in first grade was from zero to eleven years of experience in that grade. For the T.O. teachers the range was zero to twenty-five years of experience in first grade. The mean number of years of first-grade teaching experience for the i.t.a. teachers was 4.22 and for the T.O. teachers was 6.78. This difference was not significant at the .05 level of confidence. Hence, teaching experience in the grade being taught was not significantly different among the first-grade teachers teaching i.t.a. or T.O.

Among the second-grade teachers the range of experience in second grade for i.t.a. teachers was zero to twenty-one years and for T.O. teachers from zero to eleven years. The means, respectively, for the i.t.a. and T.O. teachers in their prior second-grade teaching experience was 6.84 and 4.38. The difference between these means was not significant at the .05 level of confidence. Hence, the experience of second-grade teachers in the grade being taught for the study was relatively similar for the group, with the differences observed possibly occurring as a result of chance.

### Summary statement

The teacher is obviously an important variable in a study of this sort. Hence, an attempt was made to select teachers by criteria that would ensure at least a degree of confidence and then to assign teachers randomly to each of two groups. When the number is small it is always possible, in random assignments, to have groups that are not similar. From the data above it can be seen that in most cases the teachers are fairly similar, and the minor variations which occur are unavoidable. Despite the differences in total number of years of teaching experience the number of years of teaching experience in the grade being taught was the same among the four experimental groups. It certainly does not seem that there is sufficient variation between the two groups, which suggests that any differences which occurred in the achievement of children could have been due to major variations between the kinds of teachers in each of the two groups.

# APPENDIX H

# DISTRIBUTION OF i.t.a. AND T.O. KINDERGARTEN AND FIRST-GRADE POPULATIONS, 1964-1965

| | i.t.a. | | T.O. | |
|---|---|---|---|---|
| | Sept. 1964 | June 1965 | Sept. 1964 | June 1965 |
| Kindergarten | 602 | 570 | 556 | 535 |
| First Grade | 442 | 435 | 404 | 406 |

# APPENDIX I

## HOFSTRA UNIVERSITY BEGINNING READING STUDY, 1964-1965

## PARENTS' EVALUATION OF THE i.t.a. BEGINNING READING STUDY

1. Did you know anything about i.t.a. before your child was in the study?
   Yes: 28% No: 72%

2. Did the school acquaint you with i.t.a. prior to your child being assigned to the i.t.a. class?
   Yes: 51% No: 49%

3. Was your attitude favorable at the beginning of the year?
   Yes: 71% No: 29%

4. After learning about i.t.a., did you agree with the reasons given for using i.t.a. to teach your child?
   Yes: 87% No: 13%

5. Has your attitude changed during the school year?
   Yes: 36% No: 64%

6. Did your attitude toward i.t.a. become more favorable:
   Yes: 79% No: 21%

7. Was your child ever seriously disturbed by seeing words written in the regular alphabet?
   Yes: 10% No: 90%

8. Do you feel your child reads worse than he would have had he been taught by the regular alphabet?
   Yes: 6% No: 94%

9. Does your child pick up books voluntarily and does he derive pleasure from reading?
   Yes: 93% No: 7%

10. Does your child voluntarily write at home?
    Yes: 86% No: 14%

11. Do you feel your child has had a happy experience learning with i.t.a.?
    Yes: 92% No: 8%

12. If you had a second child entering first grade this year and you had a choice of i.t.a. or reading by traditional orthography, would you want him assigned to an i.t.a. class?
    Yes: 84% No: 16%

APPENDIX J

## HOFSTRA UNIVERSITY BEGINNING READING STUDY, 1964-1965

## FIRST GRADE TEACHERS' QUESTIONNAIRE ON THE i.t.a. READING STUDY

Please answer the following questions. It is not necessary for you to write your name on this questionnaire. The purpose of this questionnaire is to help us evaluate the i.t.a. reading program.

1. Have you felt teaching with i.t.a. has been a valuable professional experience?

   Yes ______ No ______

2. Have bright, average, and/or slow pupils made more progress in your i.t.a. class than in the conventional orthography classes you have taught in the past?

   Yes ______ No ______

   Comments: ______________________________

   ______________________________

   ______________________________

   ______________________________

3. Has your attitude toward teaching reading changed?

   Yes ______ No ______

   If so, how? ______________________________

   ______________________________

   ______________________________

   ______________________________

4. Have your teaching procedures changed?

   Yes ______ No ______

   If so, how? ______________________________

   ______________________________

   ______________________________

   ______________________________

5. Would you prefer to continue teaching with i.t.a.?

Yes _____ No _____

6. Do you think all first-grade children should be taught in i.t.a.?

Yes _____ No _____

If not, which children should be excluded? ______________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

7. Have there been any complaints from parents about i.t.a. or the program?

Yes _____ No _____

Comments: ______________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

8. Have you been subjected to more "pressure" from the administration this year than previous years?

Yes _____ No _____

9. Did you get more guidance or help from your supervisor this year than you previously received?

Yes _____ No _____

Comments: ______________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

10. Were you supervised or observed more this year than in previous years?

Yes _____ No _____

Comments: ______________________________________________________________

________________________________________________________________________

# APPENDIX K

# ANALYSIS OF PARENTS', TEACHERS', AND ADMINISTRATORS' RESPONSES TO QUESTIONNAIRES

(REPRINTED IN PART FROM THE 1965-1966 REPORT)

## Parent Questionnaire

During the first year of the study, September 1964 to June 1965, one source of anxiety for the experimenters was parental acceptance of a new medium for the teaching of reading which would be discarded when the child had been taught to read with a reasonable degree of proficiency. It was feared that parents would be resistant to this procedure and might not be willing to allow their children to remain in the experimental classes. Also, if any sizable proportion of children had extreme difficulty in learning to read in the i.t.a. medium this would be reflected in negative parental attitude toward i.t.a. Three parents withdrew their children at the beginning of the experiment in the first year. The number of parents who withdrew their children at the beginning of the current year was also under five. Most of the parents who withdrew their children from the experiment gave as their primary reason they would be moving to a school district or to a community where i.t.a. was not being used. During the current year the questionnaire was expanded so that the attitude of parents whose children were in the second year of the experiment could also be ascertained. Many of the questions from the 1965 questionnaire were repeated, but there were some minor additions and changes.

Almost 100% of the parents in the i.t.a. sample returned the May 1966 questionnaire, although not every parent answered each question. The percentages calculated in response to each question reflect the percent of those answering that question. The first figure represents the response of first-grade parents, and the figure in parenthesis represents the response of second-grade parents. These were the results:

1. Did you know anything about i.t.a. before your child was in the study?
Yes: 34.4%(39.9%) No: 65.6%(60.1%)
2. Did the school acquaint you with i.t.a. prior to your child being assigned to an i.t.a. class? Yes: 66.7%(75%) No: 33.4%(25%)
3. Was your attitude favorable? Yes: 77.2%(82.5%) No: 22.8%(17.5%)
4. After your child's first-grade experience with i.t.a. do you agree with the reasons given for using i.t.a. to teach your child?
Yes: 86.4%(89.1%) No: 13.6%(10.9%)
5. Has your attitude changed from your attitude at the end of kindergarten or first grade? Yes: 35.8%(34.4%) No: 64.2%(65.6%)
6. Has your attitude become more favorable?
Yes: 75.3%(73.4%) No: 24.7%(26.6%)
7. Has your attitude become less favorable?
Yes: 13.3%(14.7%) No: 86.7%(85.3%)
8. Did your child experience any notable difficulty in making transition from i.t.a. to T.O.? Yes: 11.9%(13.5%) No: 88.1%(86.5%)
9. Was your child ever seriously disturbed by seeing words written in the regular alphabet? Yes: 8%(6.3%) No: 92%(93.7%)
10. Did your child ever revert back to i.t.a. spelling after making transition?
Yes: 59.4%(65.9%) No: 40.6%(34.1%)
11. Has your child experienced any noticeable difficulty in spelling since making transition? Yes: 25.9%(21.3%) No: 74.1%(78.7%)
12. Do you think your child reads better than, as well as, or worse than he would have, had he been taught by traditional orthography?

Better than: 61.1%(63.2%)    As well as: 35.3%(30.9%)

Worse than: 3.6%(5.9%)

13. Do you think your child spells better than, as well as, or worse than he would have, had he been taught by the regular alphabet?

Better than: 51.3%(32.6%)    As well as: 37.6%(50.2%)

Worse than: 11.1%(17.2%)

14. Does your child pick up books voluntarily and does he derive pleasure from reading?    Yes: 89%(86.9%)    No: 11%(13.1%)

15. Does your child voluntarily write at home?

Yes: 86.1%(78.2%)    No: 13.9%(21.8%)

16. Does your child write as much after transition as he did when he was still being instructed in i.t.a.?

Yes: 78.4%(82.1%)    No: 21.6%(17.9%)

17. Do you feel your child has had a happy experience learning with i.t.a.?

Yes: 95%(91.8%)    No: 5%(8.2%)

18. If you had a second child entering first grade this year and you had a choice of i.t.a. or reading by the conventional orthography, would you want him assigned to an i.t.a. class?

Yes: 79.6%(81.1%)    No: 20.4%(18.9%)

As can be seen from these results, parental acceptance and attitude toward i.t.a. has not changed materially from those attitudes expressed at the conclusion of the first year of the study. The present attitude of parents was still far more favorable than unfavorable with i.t.a. as the medium of instruction, although the experimenters felt that the original attitudes may have resulted somewhat from the generally favorable publicity which i.t.a. was given. The novelty of the program and the status accorded to their children by being involved in the experiment may have influenced their attitudes in the past year. Since their attitudes remained very favorable and there appeared to be no noticeable trend towards its becoming less favorable, it seemed that there were no major ill effects as a result of i.t.a. instruction. However, the favorable publicity accorded the program and the status attained by being involved in the experiment may still be factors influencing their favorable attitudes.

### Teacher Questionnaire: First Grade

A teacher questionnaire was administered to first-grade teachers who were involved in the i.t.a. program only, since teachers in the regular orthography experienced no differences from their normal, everyday procedure; and hence, it would be expected that their attitudes had already been formed and were not likely to change. Some of the first-grade teachers in the current year were teaching i.t.a. for the second year, while others were teaching i.t.a. for the first time. Therefore, some additional questions were asked to elicit the changes in attitude as a result of further experience in the use of i.t.a. in the classroom. Of the twenty first-grade teachers in the current year, twelve were involved in the experiment in the preceding year and were teaching i.t.a. for the second time.

One question 1, "Have you felt teaching with i.t.a. has been a valuable professional experience?" all of the first-grade teachers in the study answered in the affirmative. On question 1A, which was for teachers teaching i.t.a. for the second year, eight of the twelve teachers became more favorable toward i.t.a., four of the twelve teachers became less favorable, and none of the teachers reported his attitude was unchanged from his first year's experience. To question 2, "Have bright, average, and slow pupils made more progress in your i.t.a. class than in the conventional orthography classes you have taught in the past?" all of the teachers, again, answered "yes."

To question 3, "Has your attitude toward teaching reading changed?" 73.7% of the 19 teachers responding to this question reported "yes," while 26.3% of the teachers responded in the negative.

On question 4, "Have your teaching procedures changed?" 80% of the twenty teachers responding answered in the affirmative, while 20% answered negatively.

On question 5, which states, "If you were required to return to teaching with T.O. would you teach differently?" 82.4% of the teachers responded with "yes" and 17.6% responded with a "no." This tends to confirm the results and comments obtained on questions 3 and 4.

On question 6, "Would you prefer to continue teaching with i.t.a.?", 84.2% of the teachers responded in the affirmative, and 15.8% of the teachers responded negatively. Of the three teachers who would not want to continue teaching with i.t.a., one stated she was unsure, and the other two made no comment.

On question 7, "Do you think all first-grade children should be taught in i.t.a.?" significantly, 45% of the teachers responded "yes," and 55% of the teachers responded "no."

In general, according to comments made it seemed that the teachers would prefer to exclude slow children; those with speech problems; those with improved experimental backgrounds; those who have been instructed in T.O. and who can, already, read in T.O. prior to entering school; and only one teacher reported that the bright children should be excluded. Thus, although teachers were generally highly favorable toward i.t.a. as the medium of instruction they had serious reservations as to whether all children should be instructed in the medium.

The next question stated, "Have there been any complaints from parents about i.t.a. or the program?" Forty-five percent of the teachers reported "yes," and 55% of the teachers reported "no."

On question 9, "Have you been subjected to more pressure from the administration this year than previous years?" only one of the twenty teachers answered "yes." Nineteen of the twenty teachers responded negatively.

On question 10, "Did you get more guidance and help from your supervisor this year than you previously received?" of the eighteen teachers responding, one said "yes" and seventeen said "no." The teacher who responded in the affirmative stated in her comments, "Yes, I asked for it! Had a wonderful relationship with her!"

On question 11, "Were you supervised or observed more this year than in previous years?" 47.4% of the teachers responded "yes," 52.6% of the teachers responded "no." Most of the teachers that responded in the affirmative stated that the observations were greatly increased as a result of members of the research staff visiting classrooms. These visits were, of course, for observation only to verify experimental conditions.

In general, then, teachers seemed to enjoy working with i.t.a.; they seemed to feel that children's skills and work habits were more advanced than in T.O., although they had some reservations about the slower children; many of them had changed their attitudes and approaches toward the teaching of reading, as one teacher stated, "I am looking forward to next year with pleasure."

## Teacher Questionnaire: Second Grade

The second-grade teacher in this study had quite a different kind of problem than the first-grade teacher. In the first place, approximately 60% of the children made transition by the end of first grade, which meant that the second-grade teachers had some children in their classes who were still reading in i.t.a., and a larger number of children who had made the transition to traditional orthography. Secondly, the second-grade teacher had the problem of taking the poorer readers through the transitional period, since these were the children who had made the slowest progress in reading in first grade and had not yet reached the transition point in that year. Hence, it was felt that a separate questionnaire for these teachers would provide helpful information as to the ease or difficulty of making transition to traditional orthography with the slower readers, and also that these teachers would be able to make some judgments as to the effectiveness of the i.t.a. program in first grade, in terms of their previous experience with T.O. classes in second grade.

On question 1, "Did you encounter any difficulty in teaching a class that had been instructed in i.t.a. last year, when some children who had not made transition were instructed in i.t.a. and those who had made transition were instructed in T.O.?" 29.4% of the second-grade teachers, who numbered seventeen in all, responded in the affirmative, and 70.6% responded in the negative.

To the second question, "Do you feel your present class, that had been instructed in i.t.a. in first grade, reads better than, as well as, or worse than previous classes that had been instructed in T.O.?" 58.8% of the teachers reported that their children read better than previous classes which had been instructed in T.O., whereas 41.2% reported that their classes read as well as previous classes with which they have dealt. None of the teachers reported that the children read worse. This suggested that from the standpoint of reading level alone, slightly over half of the teachers felt that i.t.a. produced a higher reading level, but all of the teachers felt the children read as well as or better than children who had been instructed in T.O.

To question 3, "Have bright, average, and/or slow pupils made more progress in your i.t.a. class than in the conventional orthography classes you have taught in the past?" 86.7% of the teachers answered "yes," and 13.3% of the teachers answered "no."

Again, based upon comments, there was some contradiction in teachers' reports as to whether i.t.a. seemed to produce better effects on bright, average, or slow children. It is interesting to compare question 2, where only 59% of the teachers reported that their classes read better than previous classes that have received instruction in T.O., whereas 86.7% of the teachers felt that one of the three groups, the bright, average, or slow, made more progress as a result of i.t.a. than in conventional orthography that they have taught in the past. This also may reflect the fact that the values accrued from i.t.a. do not necessarily represent themselves in higher reading levels, but in greater ease of performance, better self-concept, and a more positive attitude toward reading. This can be noted in a number of the comments, where teachers reported that the slow children were finding much greater success. This, of course, may mean greater success in areas other than in terms of reading level.

On question 4, "Has your attitude toward teaching reading changed?" 52.9% responded in the affirmative, and 41.2% responded negatively. One teacher gave no response.

To question 5, "Have your teaching procedures changed? If so, how?" 64.7% of the teachers said that their teaching procedures had changed; 35.3% of the teachers felt that their procedures were the same as had been used in the past.

To question 6, "Would you prefer to continue teaching children who have been taught with i.t.a.?" 75% of the teachers answered "yes," 12.5% answered "no," and 12.5% were in doubt and could not respond. This suggests that teachers were not overly distressed by having to teach in two media for at least part of the year, and felt that the children who were instructed in i.t.a. were sufficiently successful, so that it certainly did not disturb their program; and in some cases, they seemed to feel that it had enhanced it.

On question 7, "Do you think all first-grade children should be taught in i.t.a., and if not, which children should be excluded," only one-third of the teachers felt that all children should be taught in i.t.a., 53.3% answered negatively, and 13.3% were in doubt.

To question 8, "Have there been any complaints from parents about i.t.a. or the program?" 41.2% of the teachers answered "yes," 52.9% of the teachers answered "no," and 5.9% of the teachers did not respond.

Questions 9, 10, and 11 were asked in an attempt to determine whether teachers were pressured for superior results by their administration, or whether their supervisors--by virtue of providing extensive help to the teachers--were, possibly, pushing for results; and of course, on question 11 (on supervision and observation) it would be expected that this feeling of pressure would increase because of the observations made by the research staff to verify experimental conditions. On question 9, 100% of the teachers reported that they were not subjected to more pressure this year. On question

10, 29.4% of the teachers reported that they received more guidance from their supervisors, whereas the majority (70.6%) reported that they did not receive any more supervision this year than they had previously received. The majority of teachers reported that they were observed more this year than in the past, which would have been expected.

On question 12, "Did you encounter any children who had difficulty making transition in reading?" 29.4% of the teachers responded affirmatively, 70.6% of the teachers responded negatively.

On question 13, did you encounter any children who had any difficulty with spelling?" 76.5% of the teachers answered "yes," and 23.5% of the teachers answered "no."

Again, for this question, teachers seemed to report that the greatest difficulty in the spelling area occurred among the slow children. This difficulty, of course, was expressed as problems that resulted in writing, not in taking spelling tests. This was not atypical in normal T.O. second-grade classes.

Since many of the first-grade teachers reported a vast increase in writing productivity and greater delight in creative writing, the research staff was concerned with whether this increase in writing productivity and liking for it would continue in second grade, after the children had made transition and were working in the irregular T.O. medium. The question asked (13) was "Did you encounter any children who had any difficulty in creative writing?" Thirty-seven and five-tenths percent of the teachers answered "yes," and 62.5% answered "no."

Comments made suggested two factors in operation. The first is that having something to say in terms of the creative aspects of writing seems to be somewhat related to intelligence. Second, there seems to be some decrease in the writing productivity of children after transition has occurred.

On question 14a, "Do you feel that the children's written composition work is better than, as good as, or worse than the composition of previous second graders instructed in T.O.?" 64.7% of the teachers felt the children wrote better than, 35.3% felt they wrote as good as, and none of the teachers felt that they wrote worse than previous second-grade classes that they have had. This, again, suggests that the writing ability of children--in terms of independently being able to say what they want to--seems to be somewhat better when children are instructed in i.t.a. than when they are instructed in the irregular T.O. medium.

On question 15, "Do the children in your class voluntarily engage in recreational reading more than, as much as, or less than previous second-grade classes instructed in T.O.?" 70.6% of the teachers reported the children voluntarily read more than previous classes, and 29.4% felt the children voluntarily read as much as previous classes. None of the teachers felt the children read less than they had seen in previous classes that had been instructed in T.O. Again, in comparison to the previous question about reading level, this reflects the fact that i.t.a. may be an easier medium in which to learn to read, and that more positive attitudes toward reading develop, and that the children, therefore, derive more pleasure from the reading act than they would have in T.O., if they had been instructed in the T.O. medium. There was only one comment to question 15. One teacher reported about the i.t.a. children, "They are reading snobs."

To question 16, "Have you enjoyed teaching those children who had not made transition in first grade and whom you continue to instruct in second grade?" 88.2% of the teachers responded in the affirmative, 11.8% of the teachers responded negatively, and the only comment to this question was, "Basically, because the materials were too difficult, I had to make up a lot myself, and often by the time I got some of the materials I ordered, I could not make full use of them because I made something else do in their place."

Generally, the response to this question reflects very positive attitudes toward i.t.a. on the part of the second-grade teachers. On a corollary to this question, "Would you prefer teaching those children in T.O.?" 12.5% of the teachers responded "yes," 75% of the teachers responded "no," and 12.5% of the teachers felt that it made no difference in the amount and love for reading exhibited by these children. There appeared to be no consistency to the reports of whether or not bright, average, or slow children seemed to do better with i.t.a.; and more teachers seemed to report problems with the slow children than with bright children, which, of course, could be expected. In the areas of writing and spelling, reservations were certainly noted; but in the area of writing, teachers felt that children were doing better in this area. In spelling there seemed to be fewer problems of concern to the teacher than were reported in first-grade questionnaires.

## Administrators' and Supervisors' Questionnaire

Since the administrator and supervisor in a school system bear the brunt of parental complaints and must answer to the community for any new program which is not successful, it was felt that a questionnaire directed to the administrators and supervisors of the districts would elicit the extent of discontent with i.t.a., with any noticeable problems that were resulting in this area. Also, the reading supervisors in the cooperating districts seemed to be in a better position to evaluate the effectiveness of i.t.a. from an impartial standpoint than teachers who were in one experimental group or the other.

The first question asked was, "Did you feel that i.t.a. would be an unqualified success before you began the program?" Only 14.3% of the administrators and supervisors answered in the affirmative, while 85.7% answered negatively. To the corollary to that question, "Did you feel that i.t.a. would be unsuccessful before you began the program?" all of the administrators and supervisors answered negatively. Thus, it would seem that although some reservations were felt by the administrators and supervisors before the experiment was undertaken, as any good educator would, they would not have embarked upon any program if they felt that it would have been unsuccessful.

On question 3, "Were you skeptical before you began the program, and if yes, what were and how serious were your reservations?" 63.6% of the administrators answered "yes," and 36.4% of the administrators answered "no."

To question 4, "What is your present attitude toward i.t.a.?" 87% of the administrators reported they were more favorable, and 4.3% reported being less favorable. None were still skeptical, and 8.7% had not changed their original attitudes. This reflected, of course, that most of the administrators felt that the i.t.a. program was a successful one and it obviously had not produced many of the problems which they anticipated.

Question 5 stated, "List your present attitude toward each reservation listed." Although there was verification in the answers made that most of the original reservations of the administrators no longer seemed to be held, there were still some administrators who felt that it was too early to make judgments and a few who felt that although the results were good, the results were similarly good in the T.O. classes.

On question 6, "What was the attitude of your instructional staff prior to the beginning of the study?" 21.7% of the administrators reported it as very favorable, 74% reported it as favorable (with reservations), 4.3% reported it as unfavorable (with reservations), and none reported it unfavorable.

On question 7, which was an attempt to elicit whether there had been any attitudinal change, administrators were asked what the attitudes of their instructional staffs are at the present time. On this question, 82.6% reported "very favorable," 17.4% reported favorable (with reservations), and none reported unfavorable. Hence, as can be seen from the above results, the original attitude of the instructional staff was positive toward i.t.a., although there were reservations expressed. Many of these reservations seemed to have been alleviated as a result of the first two years' experience in working with i.t.a. within the district.

On question 8, "What is the attitude of the instructional staff not engaged in i.t.a.?" 28.6% of the administrators reported it as very favorable, 66.7% reported it as favorable (with reservations), and none reported it as unfavorable with, or without reservations.

Questions 9 and 10 are, basically, corollaries of one another. Question 9 stated, "Have teachers who are not in the study requested participation in the study?" and question 10 asked, "Have any teachers who taught with i.t.a. requested a return to teaching with T.O.?" Sixty and nine-tenths per cent of the administrators reported teacher requests to participate in the study; 39.1% reported no requests for this. Thirteen per cent of the administrators reported requests to return to T.O. teaching, while 87% of the administrators reported no requests to return to T.O. classes. These questions also reflected a generally positive attitude toward the i.t.a. program and the teachers' satisfaction with it.

On question 11, "The parents' acceptance of the program has been favorable, unfavorable, or other," 100% of the administrators reported parental acceptance as favorable.

On question 12, "Have any parents requested that children be removed from i.t.a. classes and placed in T.O. classes, and if so, how many?" 43.5% of the administrators reported that parents had made such a request to place their children in T.O. classes, and 56.5% reported no such requests. The largest number reported by any administrator as requesting removal from the i.t.a. program was 2. Question 13, a corollary of question 12, was asked to determine acceptance, that was whether the administrators had encountered any difficulties with members of the boards of education who had expressed disapproval of the program. All of the administrators reporting stated that they had had no difficulties with the boards of education.

On question 14, "When the study is completed, will you continue to use i.t.a. as the medium of instruction in beginning reading?" 73.9% reported in the affirmative, 8.7% reported in the negative, and 17.4% were still undecided. A corollary of this question was 15, "If you were given complete option as to how you would handle beginning reading instruction, would you want all of the first-grade classes to be instructed in i.t.a.?" Forty-seven and eight-tenths per cent of the administrators responded "yes," 34.8% answered "no," and 17.4% were undecided.

On question 16, 81.8% of the administrators reported that children instructed in i.t.a. are reading better than and 18.2% as well as children who were instructed in T.O. None reported that children who were instructed in the i.t.a. program were reading worse than children instructed in T.O., regardless of their test results.

On question 17, 100% of the administrators felt that the written composition of children being instructed in i.t.a. was better than that of children being instructed in T.O., regardless of test results.

On question number 18, "Do you feel that there are any specific difficulties in making transition from i.t.a. to T.O.?" 9.1% of the administrators responded "yes," and 90.9% responded "no."

In general, then, the administrators seemed to be highly favorable toward the program, and have had minor and few difficulties with the community, with parents, and with teachers. Although generally they still seemed to be quite favorable, many of them continued to express reservations and some felt that it was still too early to make any real judgments as to the effectiveness of the program. The results of the administrators' questionnaires seemed to verify and confirm the attitudes expressed by teachers and parents, although there was some question as to whether a Hawthorne Effect was operating in all three questionnaires.

## APPENDIX L

## TABLE A

## PERCENTAGE OF THIRD-GRADE i.t.a. AND T.O. PUPILS AT EACH INSTRUCTIONAL READER LEVEL, MAY 1967

| | Percentage of Pupils | | | |
|---|---|---|---|---|
| Reader Level | i.t.a.<br>N=326 | | T.O.<br>N=288 | |
| $1^2$ | .3 | .3 | .7 | .7 |
| $2^1$ | 1.5 | 1.8 | 1.7 | 2.4 |
| $2^2$ | 4.3 | 6.1 | 4.9 | 7.3 |
| $3^1$ | 7.9 | 14.0 | 12.2 | 19.5 |
| $3^2$ | 39.6 | 53.6 | 53.1 | 72.6 |
| $4^1$ | 26.4 | 80.0 | 17.7 | 90.3 |
| $4^2$ | 8.9 | 88.9 | 3.5 | 93.8 |
| $5^1$ | 9.3 | 98.2 | 6.2 | 100 % |
| $5^2$ | .9 | 99.1 | | |
| $6^1$ | | | | |
| $6^2$ | .9 | 100 % | | |
| | 100 % | | 100 % | |

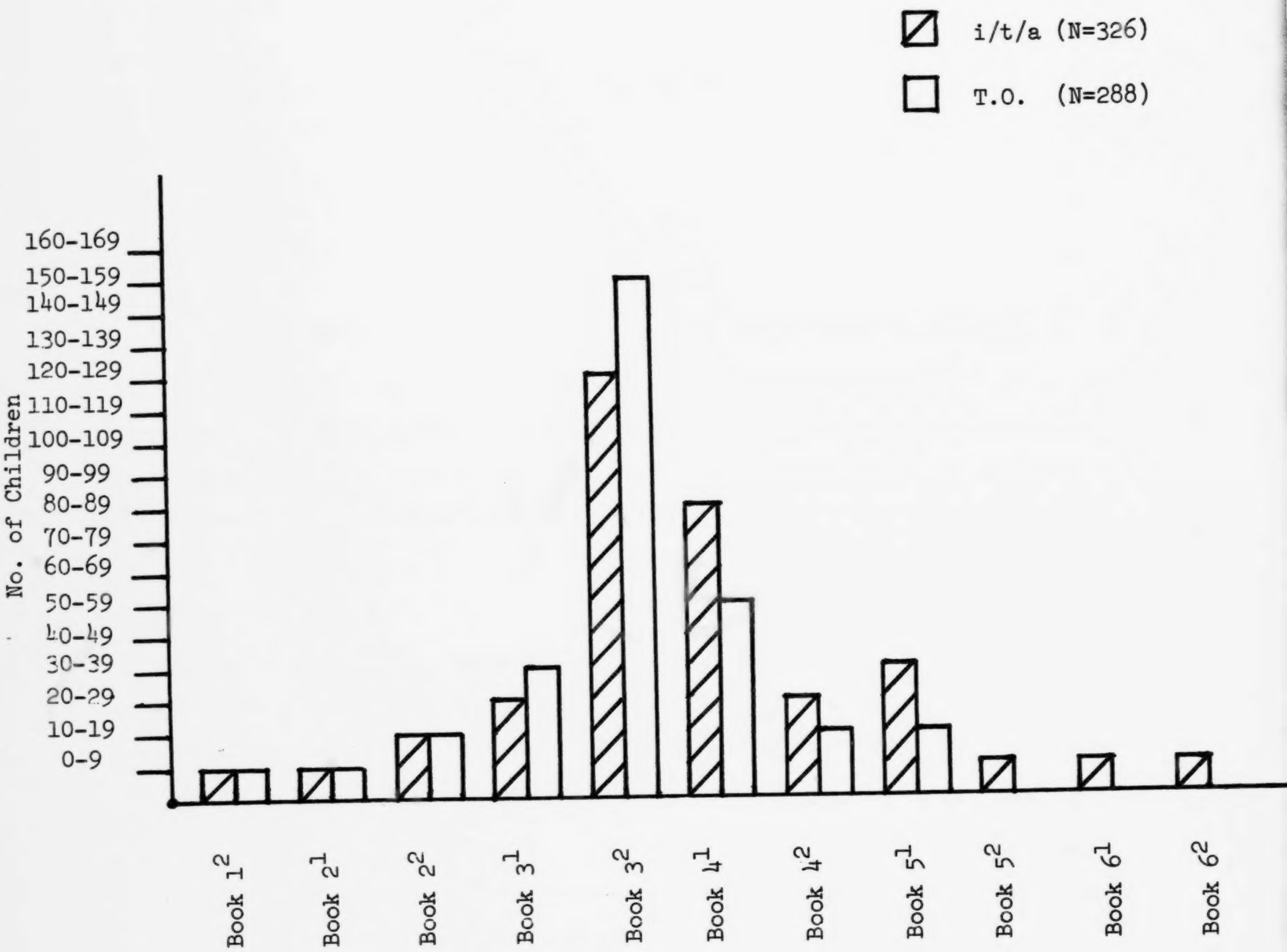


Figure A Instructional Reading Level of Third-Grade i.t.a. and T.O. Pupils, May 1967

# APPENDIX M

## TABLE A

## ANALYSIS OF COVARIANCE FOR THE COMPOSITE READING SCORE FOR THE THIRD-GRADE i.t.a. AND T.O. GROUPS

| Sources | Sums of Squares | df | Mean Square | F | Mean Square |
|---|---|---|---|---|---|
| Regression | 762.94 | 2.00 | | | |
| Treatment | 15.11 | 1.00 | 15.11 | 5.30* | 3.89 |
| Independent Variables | 729.06 | 1.00 | 729.06 | 255.78 | 27.00 |
| I.Q. Adjusted | 729.06 | 1.00 | 729.06 | 255.78 | 27.00 |
| Residual | 1319.70 | 463.00 | 2.85 | | 1.69 |
| Total | 2082.64 | 465.00 | | | |

| | i.t.a. | T.O. |
|---|---|---|
| Unadjusted Means | 12.40 | 11.86 |
| Adjusted Means | 12.32 | 11.96 |

*Significant at the .05 level of confidence

## TABLE B

## ANALYSIS OF COVARIANCE FOR THE WORD MEANING SUBTEST FOR THE THIRD-GRADE i.t.a. AND T.O. GROUPS

| Source | Sums of Squares | df | Mean Square | F | Mean Square |
|---|---|---|---|---|---|
| Regression | 3654.44 | 2.00 | | | |
| Treatment | 58.01 | 1.00 | 58.01 | 3.65 | 7.62 |
| Independent Variables | 3513.84 | 1.00 | 3513.84 | 220.81 | 59.28 |
| I.Q. Adjusted | 3513.84 | 1.00 | 3513.84 | 220.81 | 59.28 |
| Residual | 7367.87 | 463.00 | 15.91 | | 3.99 |
| Total | 11022.31 | 465.00 | | | |

| | i.t.a. | T.O. |
|---|---|---|
| Unadjusted Means | 27.78 | 26.67 |
| Adjusted Means | 27.61 | 26.89 |

## TABLE C

## ANALYSIS OF COVARIANCE FOR THE PARAGRAPH MEANING SUBTEST FOR THE THIRD-GRADE i.t.a. AND T.O. GROUPS

| Source | Sums of Squares | df | Mean Square | F | Mean Square |
|---|---|---|---|---|---|
| Regression | 12965.25 | 2.00 | | | |
| Treatment | 2.00 | 1.00 | 2.00 | 0.04 | 1.42 |
| Independent Variables | 12875.00 | 1.00 | 12875.00 | 228.44 | 113.47 |
| I.Q. Adjusted | 12875.00 | 1.00 | 12875.00 | 228.44 | 113.47 |
| Residual | 26095.24 | 463.00 | 56.36 | | 7.51 |
| Total | 39060.49 | 465.00 | | | |

| | i.t.a. | T.O. |
|---|---|---|
| Unadjusted Means | 44.53 | 43.60 |
| Adjusted Means | 44.19 | 44.06 |

## TABLE D

## ANALYSIS OF COVARIANCE FOR THE WORD STUDY SKILLS SUBTEST FOR THE THIRD-GRADE i.t.a. AND T.O. GROUPS

| Source | Sums of Squares | df | Mean Square | F | Mean Square |
|---|---|---|---|---|---|
| Regression | 10871.97 | 2.00 | | | |
| Treatment | 1041.75 | 1.00 | 1041.75 | 13.44** | 32.28 |
| Independent Variables | 9332.36 | 1.00 | 9332.36 | 120.41 | 96.60 |
| I.Q. Adjusted | 9332.36 | 1.00 | 9332.36 | 120.41 | 96.60 |
| Residual | 35883.89 | 463.00 | 77.50 | | 8.80 |
| Total | 46755.86 | 465.00 | | | |

| | i.t.a. | T.O. |
|---|---|---|
| Unadjusted Means | 51.72 | 48.06 |
| Adjusted Means | 51.44 | 48.42 |

**Significant at the .01 level of confidence

## TABLE E

## ANALYSIS OF COVARIANCE FOR THE SPELLING SUBTEST FOR THE THIRD-GRADE i.t.a. AND T.O. GROUPS

| Source | Sums of Squares | df | Mean Square | F | Mean Square |
|---|---|---|---|---|---|
| Regression | 1879.33 | 2.00 | | | |
| Treatment | 28.10 | 1.00 | 28.10 | 0.98 | 5.30 |
| Independent Variables | 1809.70 | 1.00 | 1809.70 | 62.92 | 42.54 |
| I.Q. Adjusted | 1809.70 | 1.00 | 1809.70 | 62.92 | 42.54 |
| Residual | 13316.93 | 463.00 | 28.76 | | 5.36 |
| Total | 15196.26 | 465.00 | | | |

| | i.t.a. | T.O. |
|---|---|---|
| Unadjusted Means | 24.03 | 23.25 |
| Adjusted Means | 23.91 | 23.41 |

## TABLE F

## ANALYSIS OF VARIANCE FOR THE COMPOSITE READING SCORE SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF SECOND GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| Grand Mean | 1 | - | - |
| I.Q. | 2 | 66.48 | 37.99 |
| Methods | 1 | 129.25 | 31.75** |
| Class/Method | 46 | 4.0711 | 2.33 |
| Method X I.Q. | 2 | .76 | .44 |

**Significant at the .01 level of confidence

## TABLE G

## ANALYSIS OF VARIANCE FOR THE COMPOSITE READING SCORE SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| Grand Mean | 1 | - | - |
| I.Q. | 2 | 291.35 | 90.52 |
| Methods | 1 | 14.47 | 4.50* |
| Method X I.Q. | 2 | 2.42 | .75 |

*Significant at the .05 level of confidence

## TABLE H

## ANALYSIS OF VARIANCE FOR THE WORD MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| Grand Mean | 1 | - | - |
| I.Q. | 2 | 1379.32 | 77.40 |
| Methods | 1,460 | 58.03 | 3.26* |
| Method X I.Q. | 2 | 4.10 | .23 |

*Significant at the .05 level of confidence

## TABLE I

## ANALYSIS OF VARIANCE FOR THE PARAGRAPH MEANING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| Grand Mean | 1 | - | - |
| I.Q. | 2 | 4795.04 | 75.17 |
| Methods | 1 | 2.18 | .03 |
| Method X I.Q. | 2 | 62.80 | .98 |

## TABLE J

## ANALYSIS OF VARIANCE FOR THE WORD STUDY SKILLS SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| Grand Mean | 1 | - | - |
| I.Q. | 2 | 4187.21 | 51.71 |
| Methods | 1 | 970.70 | 11.99* |
| Method X I.Q. | 2 | 81.32 | 1.00 |

*Significant at the .05 level of confidence

## TABLE K

## ANALYSIS OF VARIANCE FOR THE SPELLING SUBTEST OF THE STANFORD ACHIEVEMENT TEST, PRIMARY II, AT THE END OF THIRD GRADE

| Source | df | Mean Square | F |
|---|---|---|---|
| Grand Mean | 1 | - | - |
| I.Q. | 2 | 706.66 | 24.03 |
| Methods | 1 | 26.03 | .89 |
| Method X I.Q. | 2 | 114.15 | 3.88 |

# APPENDIX N

## TABLE A

## COMPARISON OF THE MEAN TIME, IN MINUTES, SPENT IN DIRECT INSTRUCTION AND RELATED ACTIVITIES BETWEEN THE i.t.a. AND T.O. SECOND-GRADE TEACHERS

| Treatment | N | Mean (Minutes) | SD |
|---|---|---|---|
| i.t.a. | 24 | 167.5 | 31.6 |
| T.O. | 19 | 167.5 | 23.0 |

## TABLE B

## MEAN TIME, IN MINUTES, SPENT IN DIRECT INSTRUCTION AND RELATED ACTIVITIES BY THIRD-GRADE TEACHERS

| Group | N | Mean (Minutes) | SD |
|---|---|---|---|
| Third Grade | 48 | 162.5 | 27.9 |

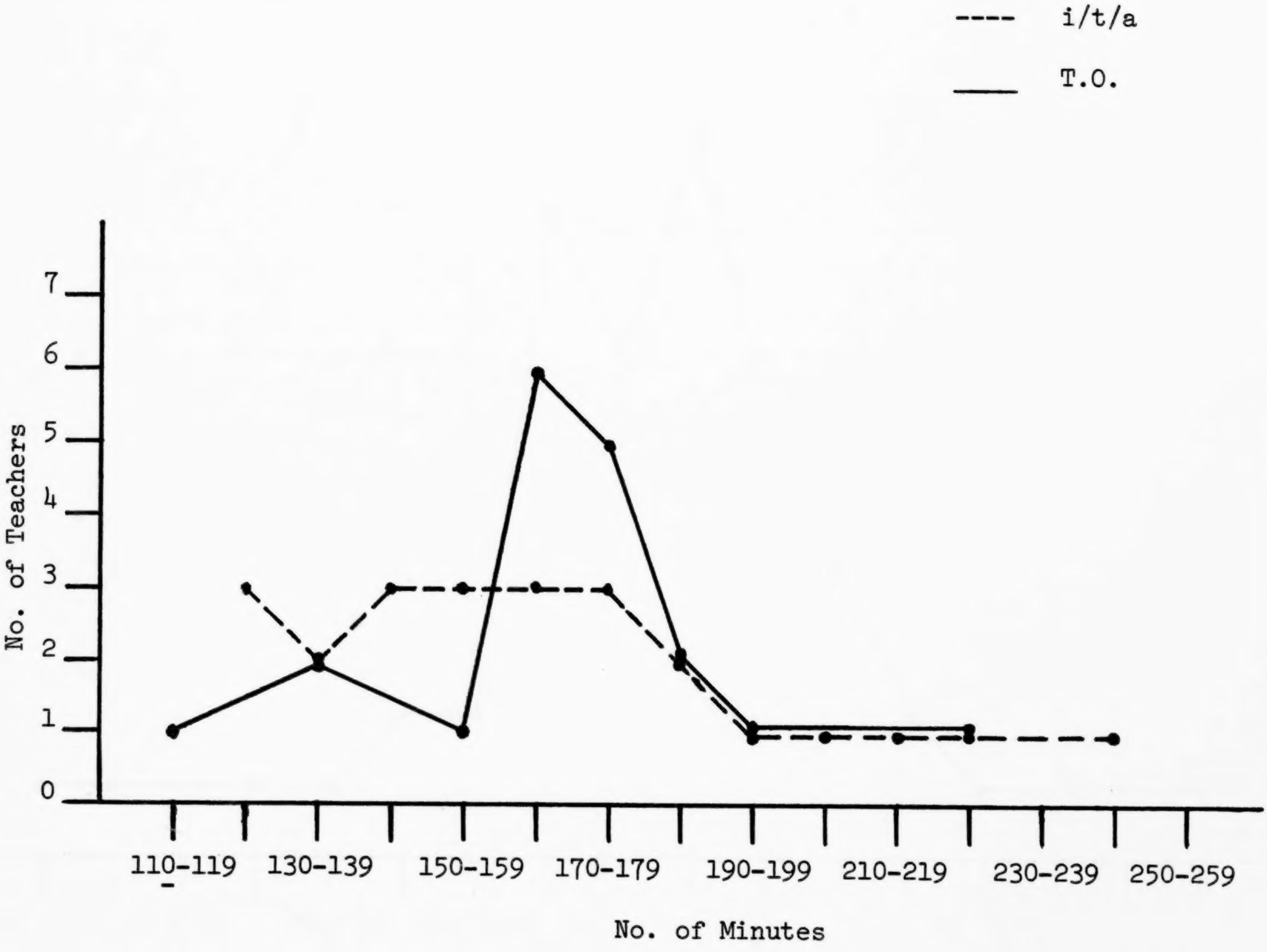


Figure A Average Number of Minutes per Day Spent in Direct Reading Instruction and Related Activities based on Three Sample Logs (Fall, Winter, Spring) of Second-Grade i.t.a. and T.O. Teachers.

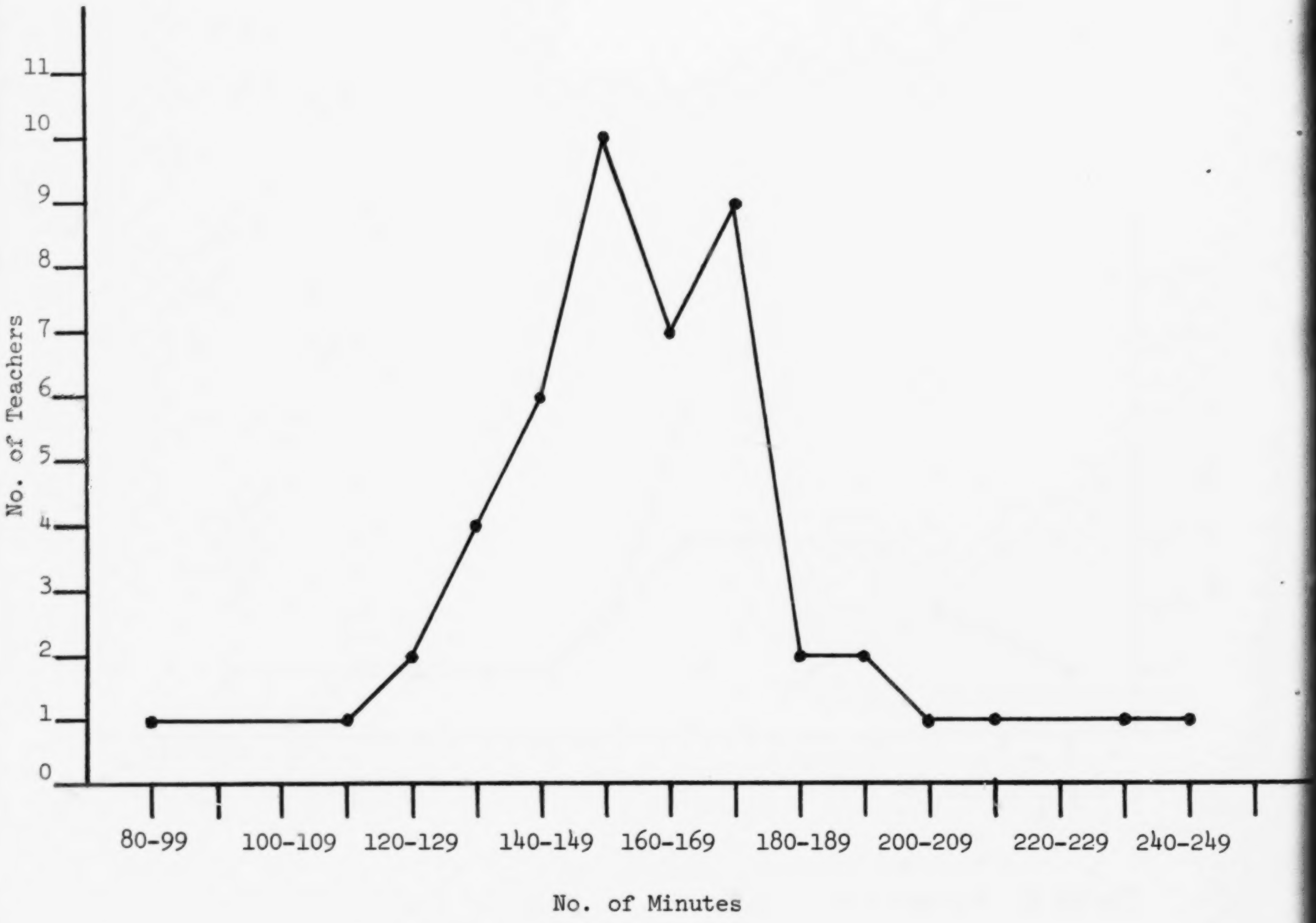


Figure B Average Number of Minutes per Day Spent in Direct Reading Instruction and Related Activities Based on Two Sample Logs (Fall, Spring) of Third-Grade Teachers.

## APPENDIX O

### SOCIOECONOMIC DISTRIBUTION WITHIN EACH DISTRICT PERCENTAGE DISTRIBUTION BY CATEGORY FROM SIMS OCCUPATIONAL SCALE FOR EACH DISTRICT

| District | Category | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1. | 18.8 | 12.5 | 11.8 | 3.3 | 38.3 | 5.8 | 8.2 | 1.5 |
| 2. | 19.4 | 29.0 | 19.4 | 3.2 | 20.9 | 6.5 | 1.6 | 0 |
| 3. | 7.2 | 10.0 | 15.0 | 2.9 | 46.4 | 4.3 | 12.1 | 2.1 |
| 4. | 37.3 | 28.4 | 16.7 | 1.0 | 9.8 | 2.9 | 3.9 | 0 |
| 5. | 39.2 | 4.0 | 6.8 | 4.0 | 31.1 | 0 | 14.9 | 0 |
| 6. | 33.1 | 23.8 | 15.0 | 4.4 | 18.8 | 3.1 | 1.2 | .6 |
| 7. | 24.7 | 16.4 | 13.7 | 4.1 | 31.5 | 8.2 | 1.4 | 0 |
| 8. | 7.8 | 7.0 | 18.3 | 4.3 | 44.3 | 10.4 | 7.0 | .9 |
| 9. | 21.5 | 8.9 | 12.6 | 5.1 | 36.7 | 5.1 | 10.1 | 0 |
| 10. | 39.5 | 19.7 | 5.3 | 2.6 | 26.3 | 2.6 | 4.0 | 0 |
| 11. | 16.2 | 20.3 | 16.2 | 5.4 | 24.3 | 14.9 | 2.7 | 0 |

Legend:
1. Professional
2. Owner-Manager
3. Salesman
4. Foreman
5. Technical (Skilled and Semi-Skilled)
6. Clerical
7. Unskilled
8. Unemployed

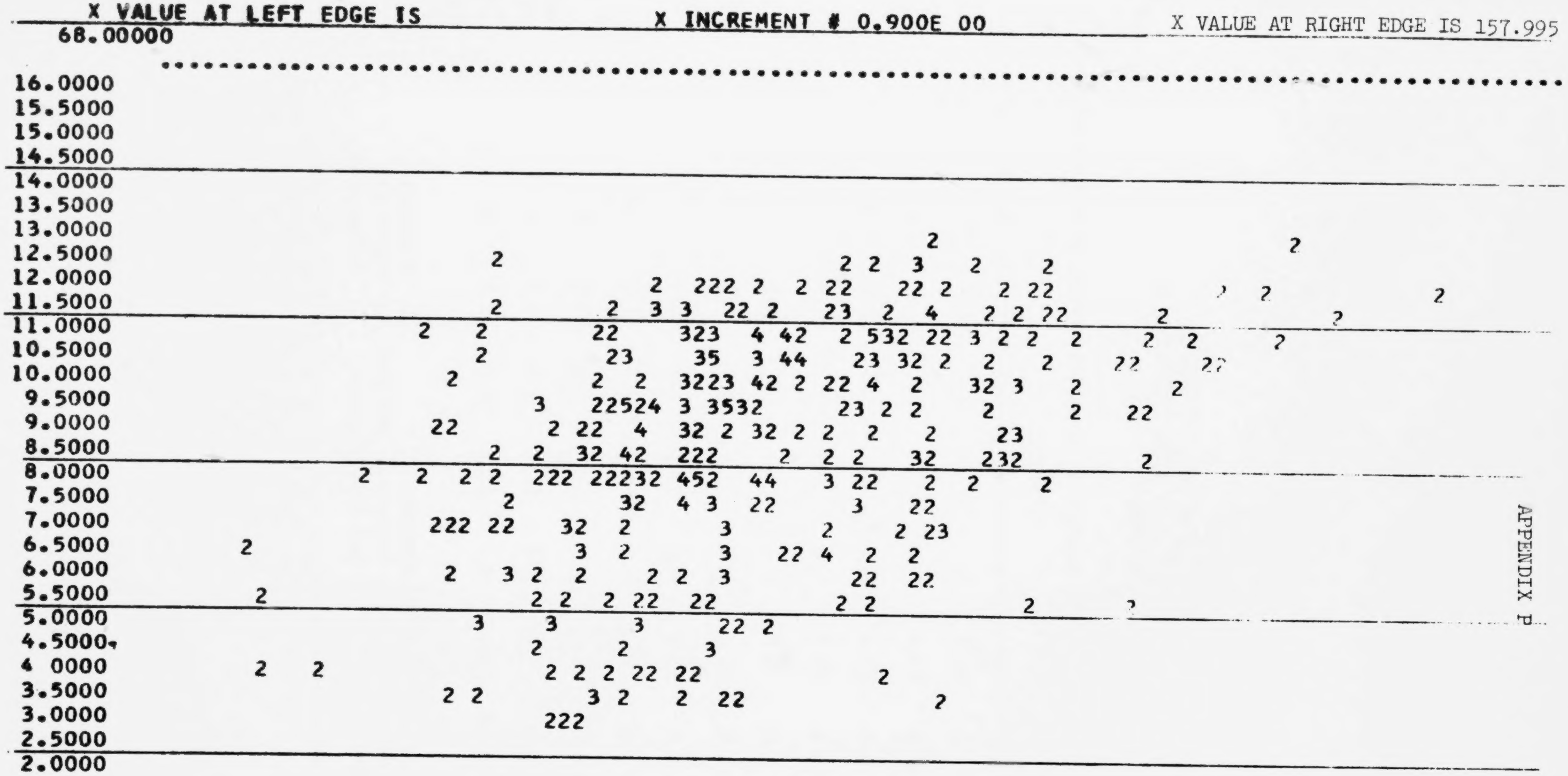


Figure A1 Bivariate Distribution Of Composite Reading Scores And I.Q. Scores Of The Second Grade i.t.a. Population With Kindergarten Reading Instruction (1966-67)

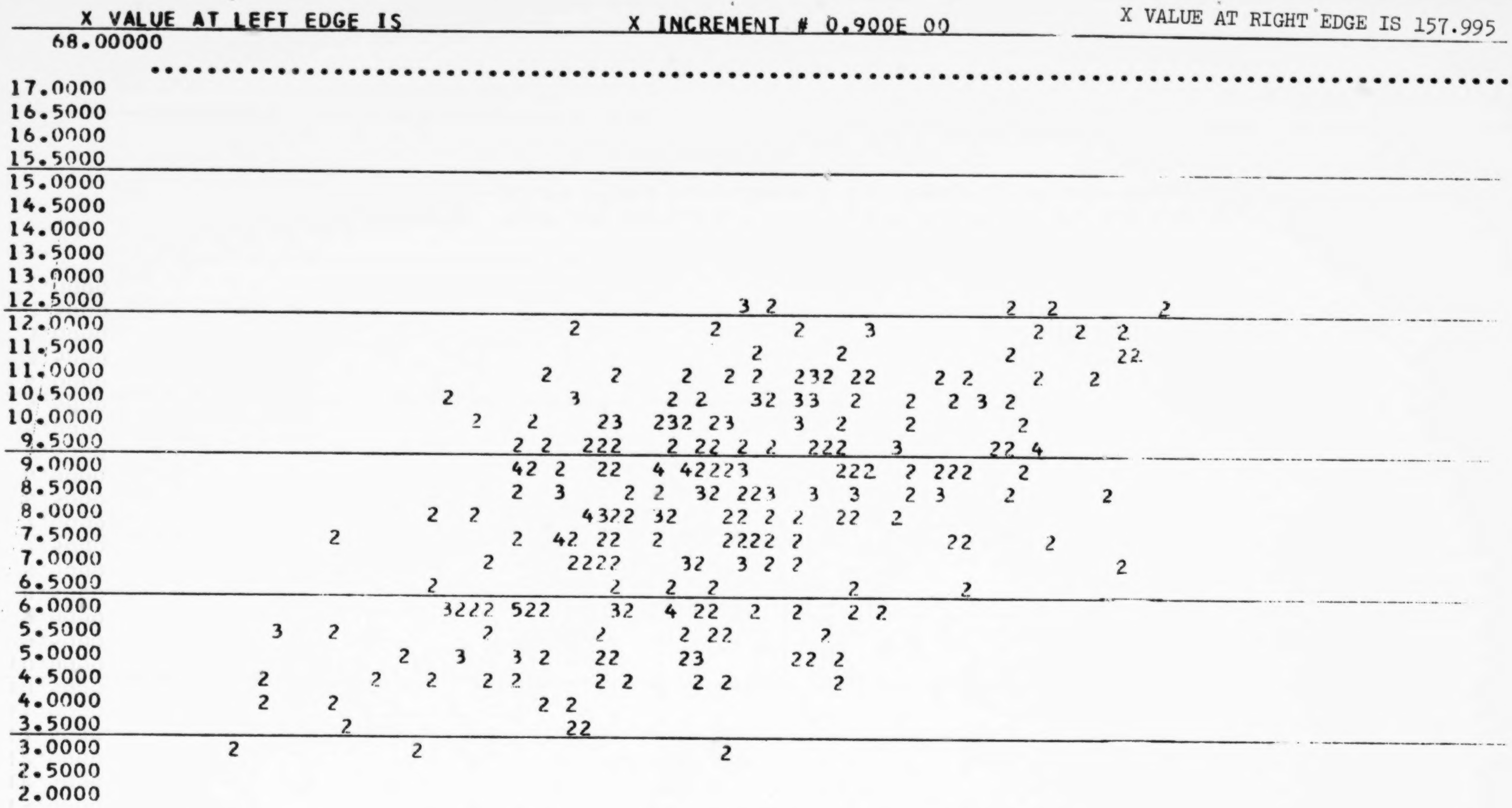


Figure A2 Bivariate Distribution of Composite Reading Scores And I.Q. Scores Of The Second Grade T.O. Population With Kindergarten Reading Instruction (1966-67)

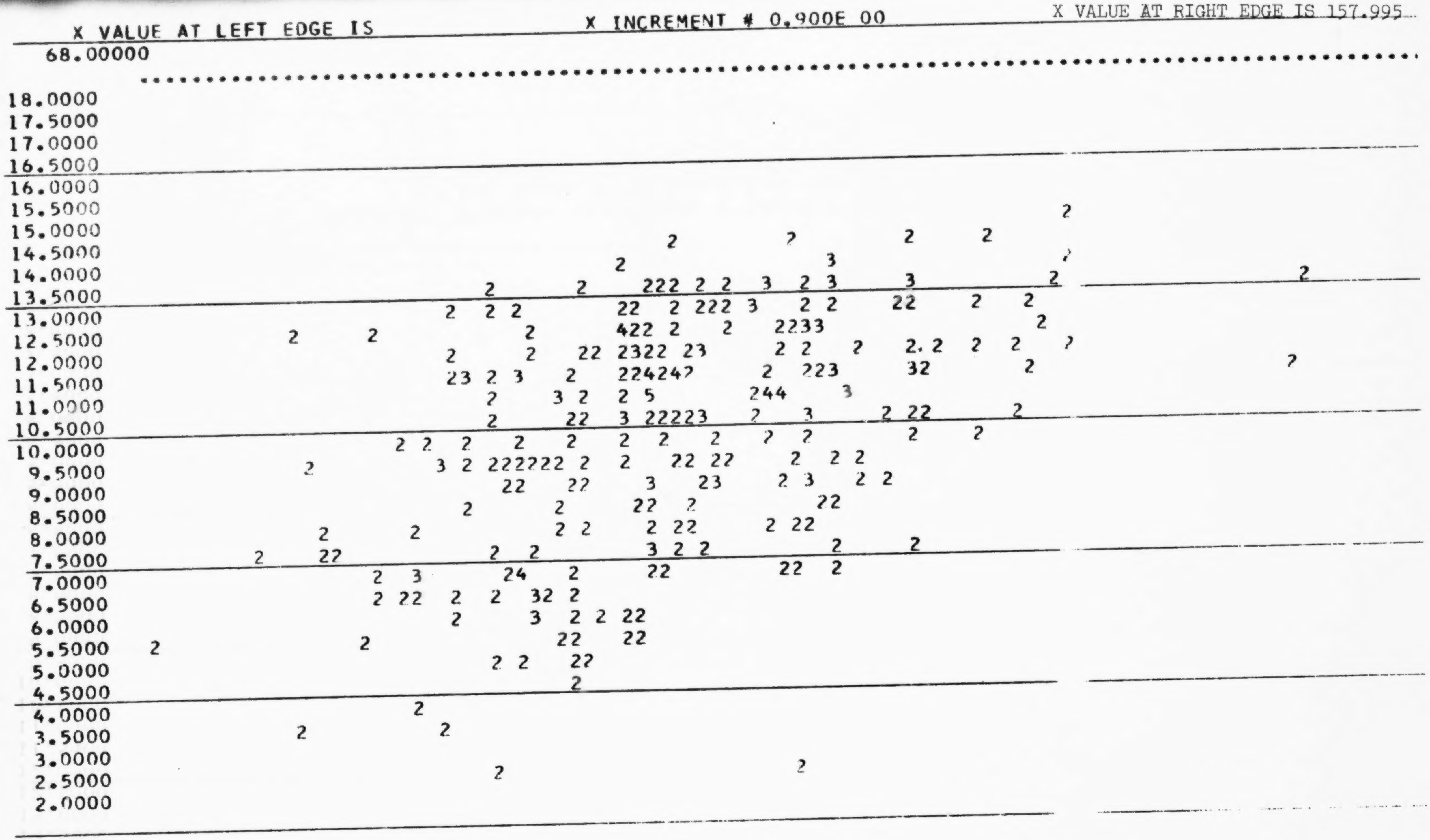


Figure A3 Bivariate Distribution Of Composite Reading Scores And I.Q. Scores Of The Second Grade i.t.a. Population Without Kindergarten Reading Instruction (1966-67)

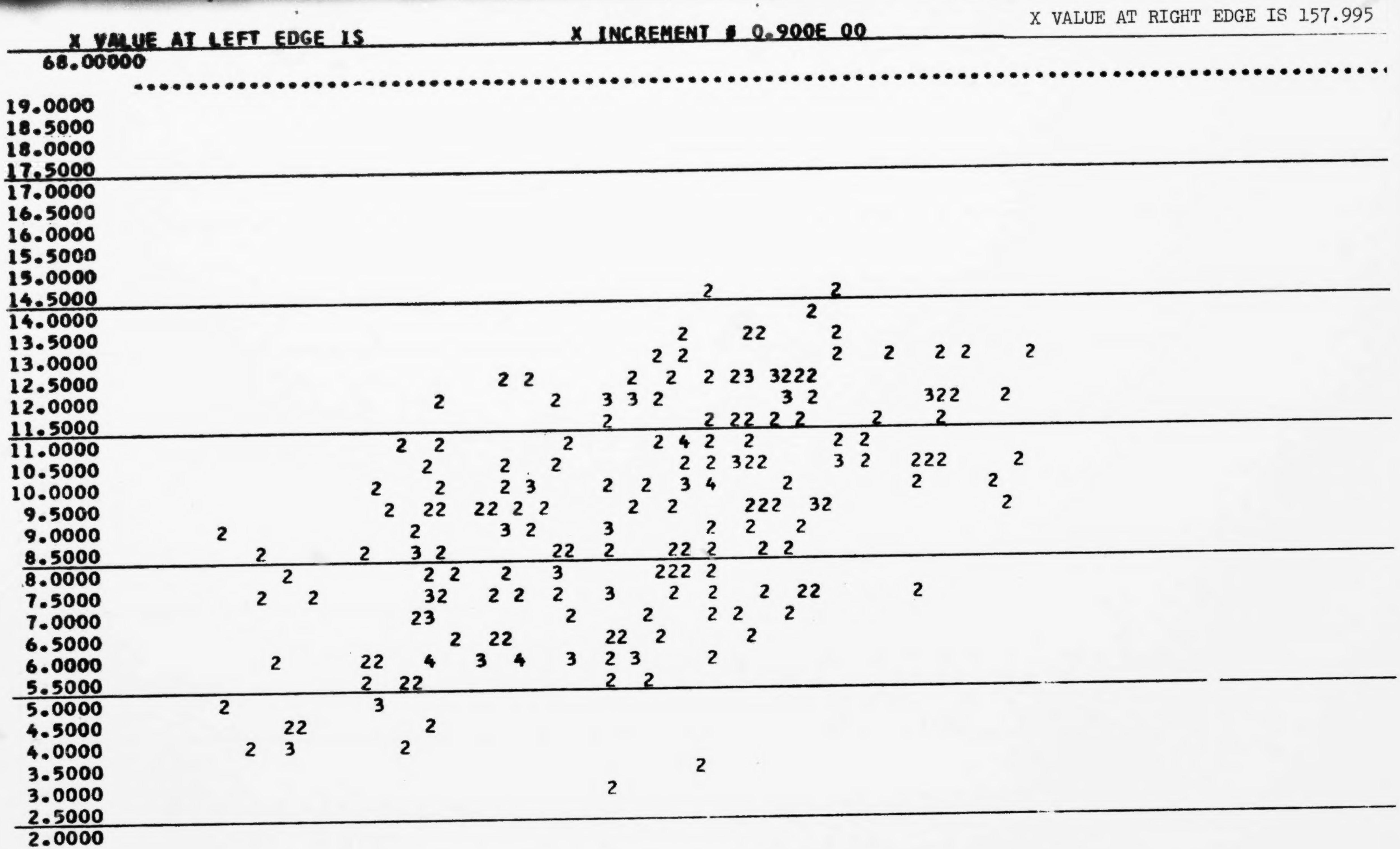


Figure A4 Bivariate Distribution Of Composite Reading Scores And I.Q. Scores Of The Second Grade T.O. Population Without Kindergarten Reading Instruction (1966-67)

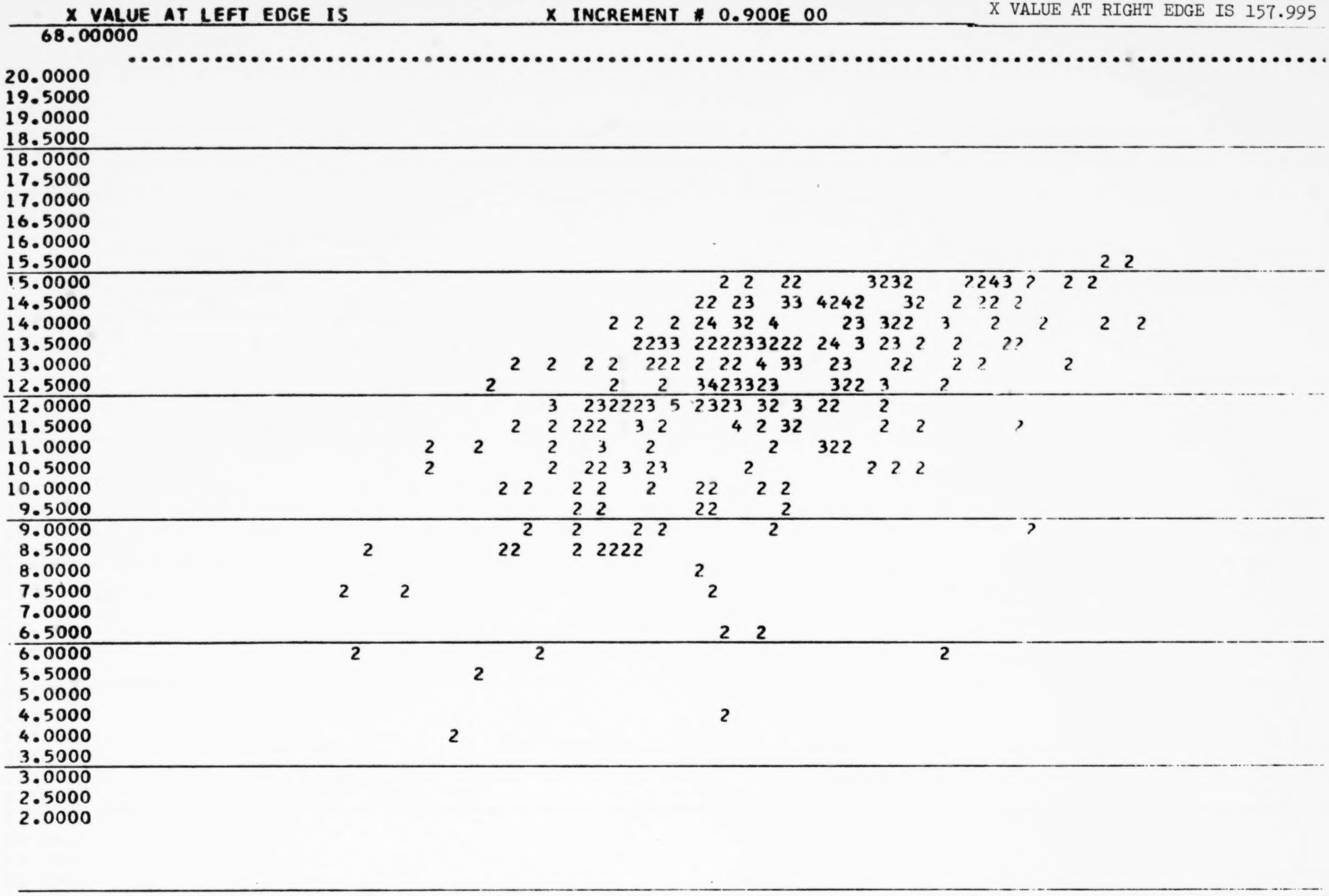


Figure A5 Bivariate Distribution Of Composite Reading Scores And I.Q. Scores Of The Third Grade i.t.a. Population Without Kindergarten Reading Instruction (1966-67)

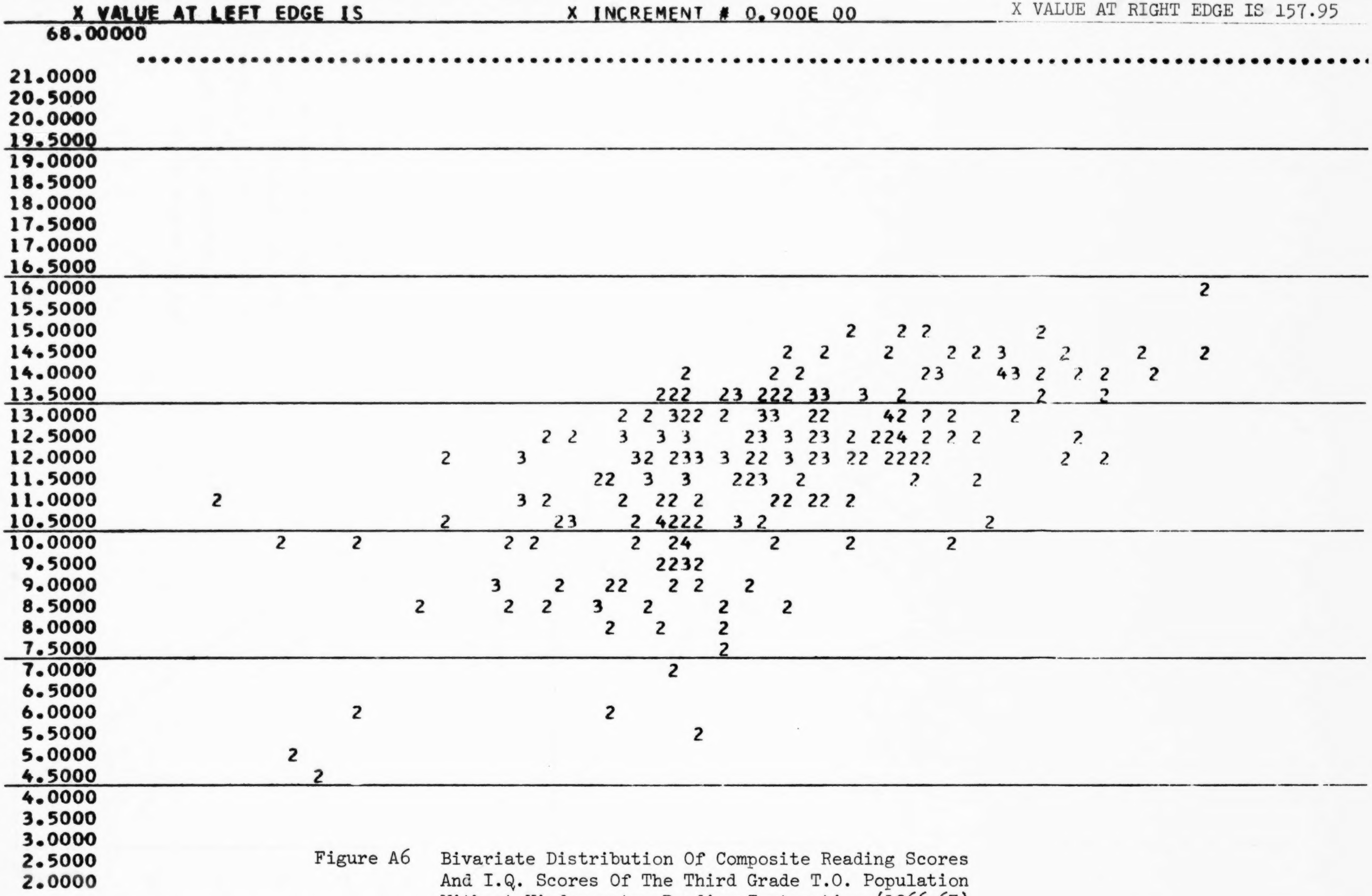


Figure A6 Bivariate Distribution Of Composite Reading Scores And I.Q. Scores Of The Third Grade T.O. Population Without Kindergarten Reading Instruction (1966-67)

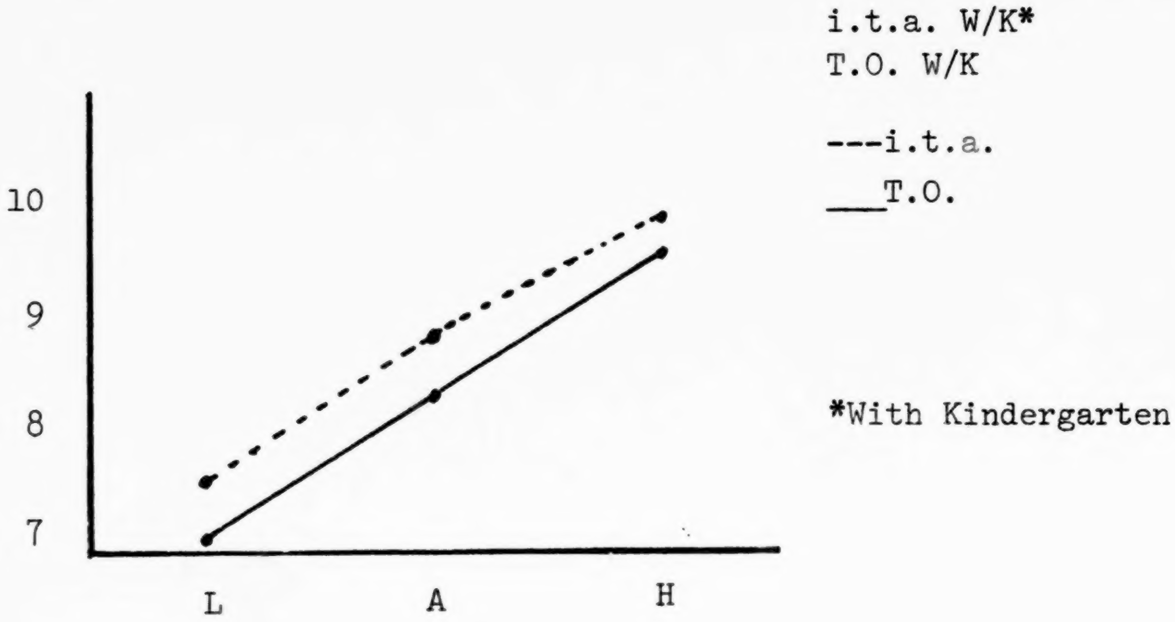


Figure A7 Relationship Between Treatment And I.Q. On The Composite Reading Score (Word Meaning, Paragraph Meaning, Word Study Skills) Of The Stanford Achievement Test, Primary II, At The End of Second Grade

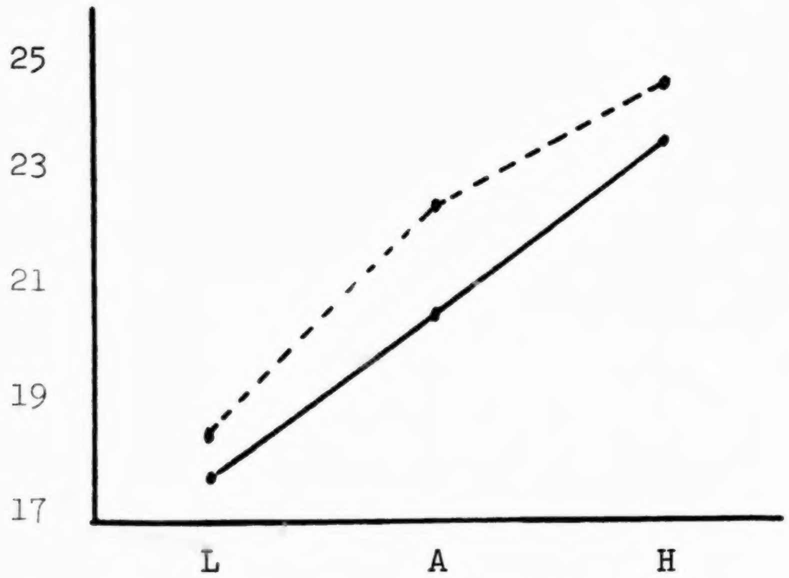


Figure A8 Relationship Between Treatment And I.Q. On Word Meaning Subtest Of The Stanford Achievement Test, Primary II, At The End of Second Grade

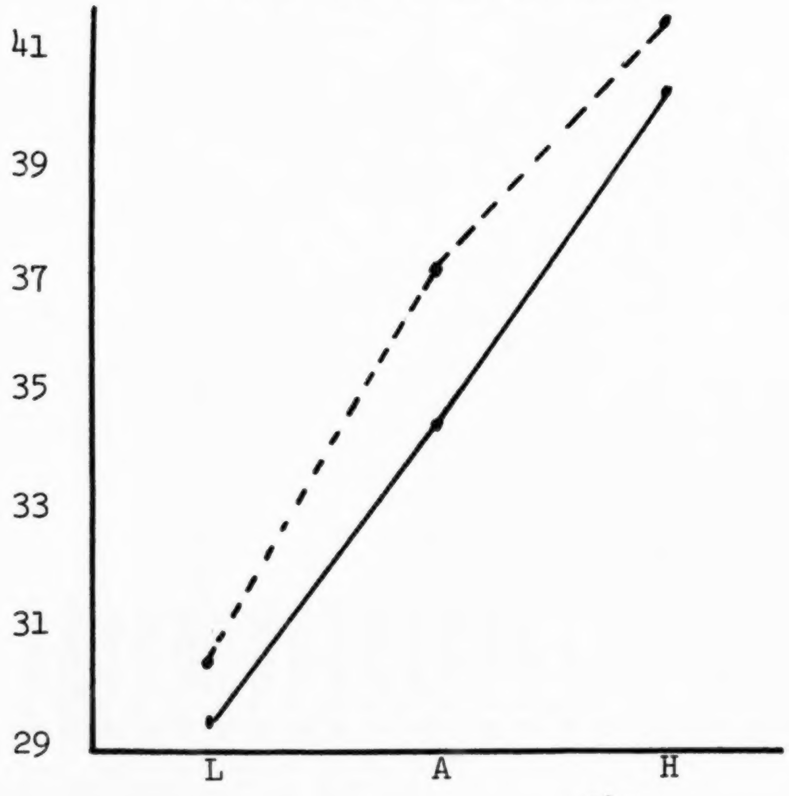


Figure A9 Relationship Between Treatment And I.Q. On Paragraph Meaning Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

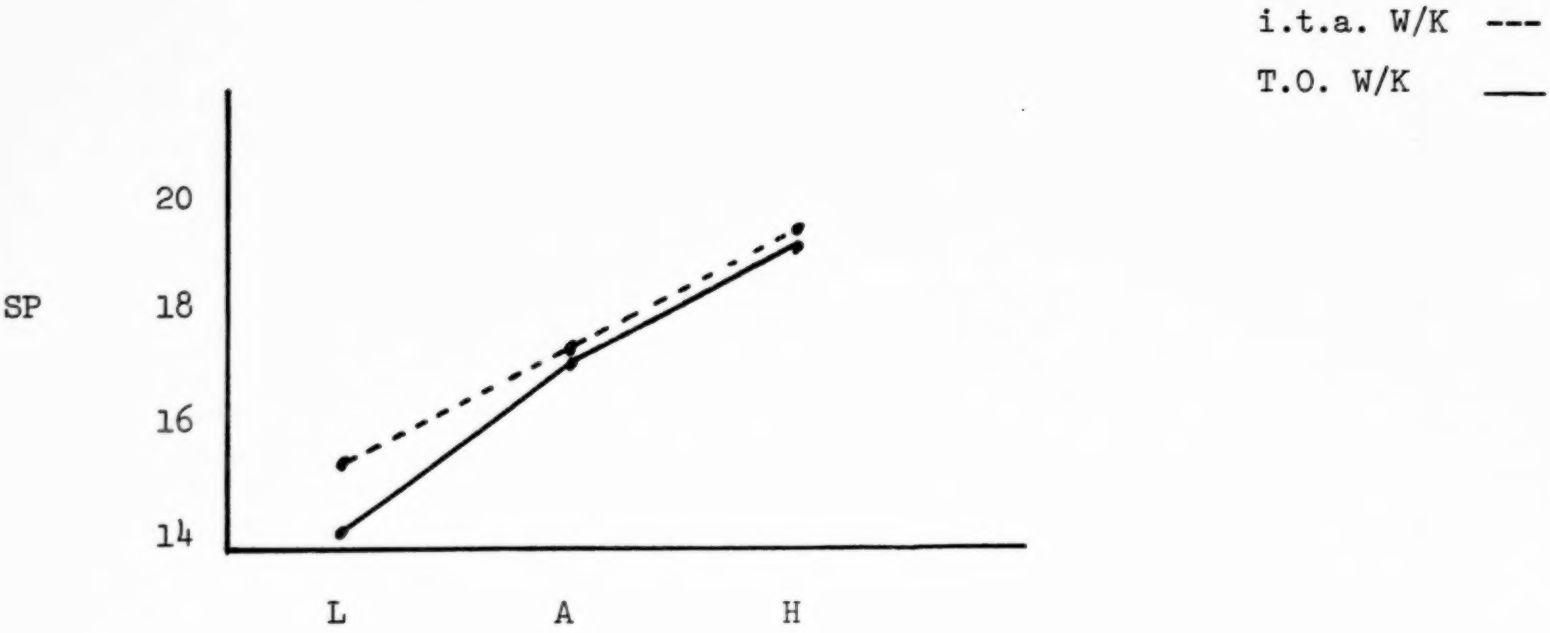


Figure A10 Relationship Between Treatment And I.Q. On Spelling Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade.

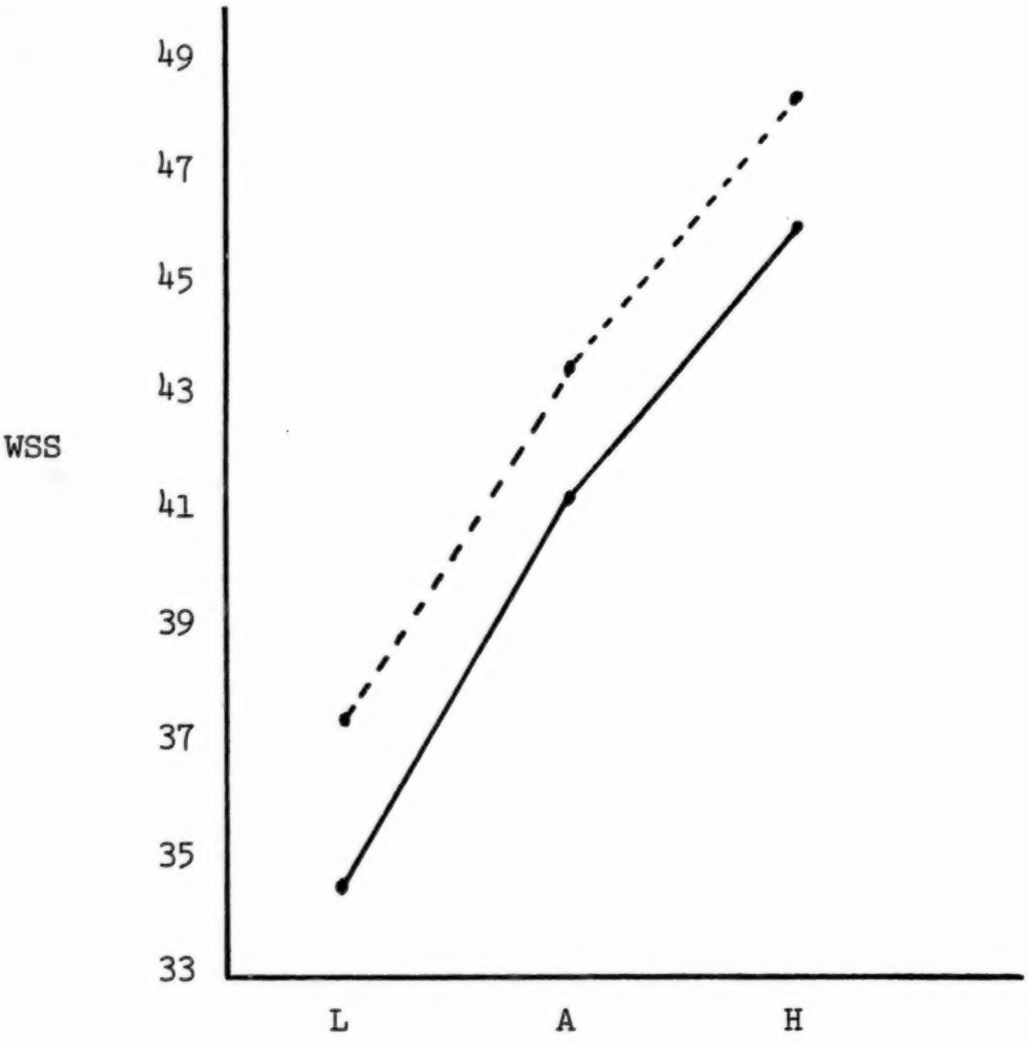


Figure A11 Relationship Between Treatment And I.Q. On Word Study Skills Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

T.O.*WO/k---
T.O. W/K___

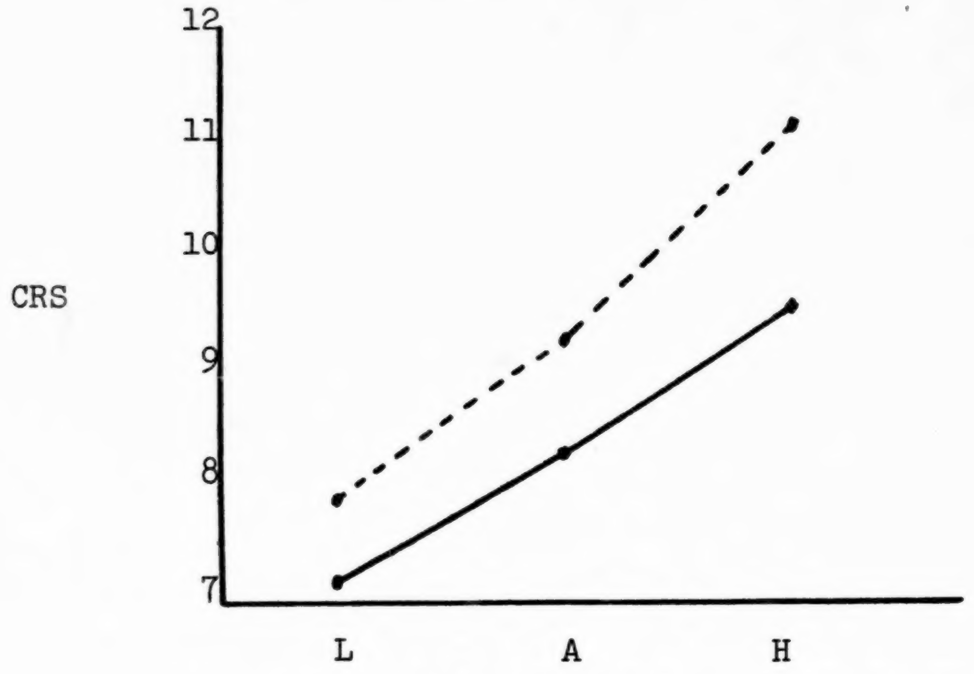


Figure A12 Relationship Between Treatment And I.Q. On The Composite Reading Score (Word Meaning, Paragraph Meaning, Word Study Skills) Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

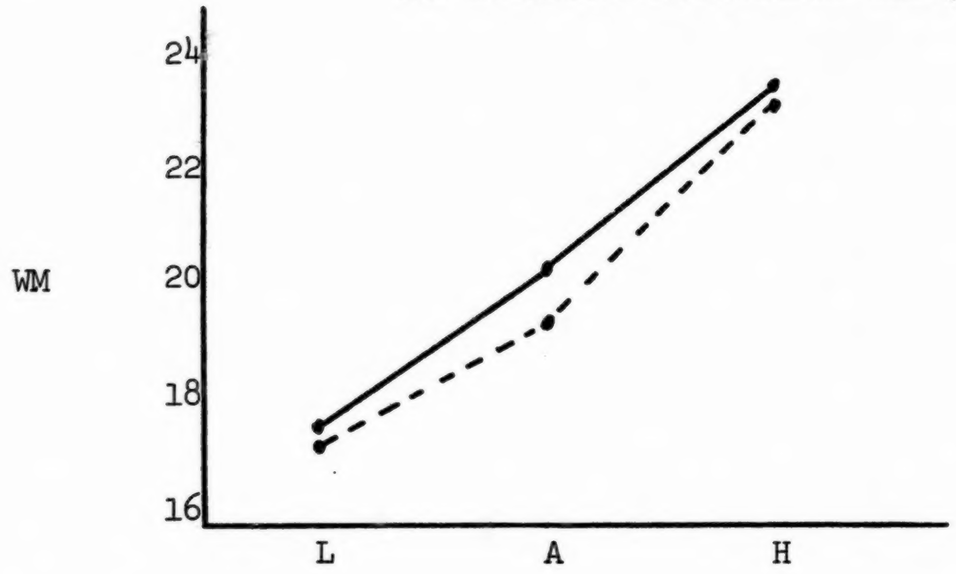


Figure A13 Relationship Between Treatment And I.Q. On Word Meaning Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

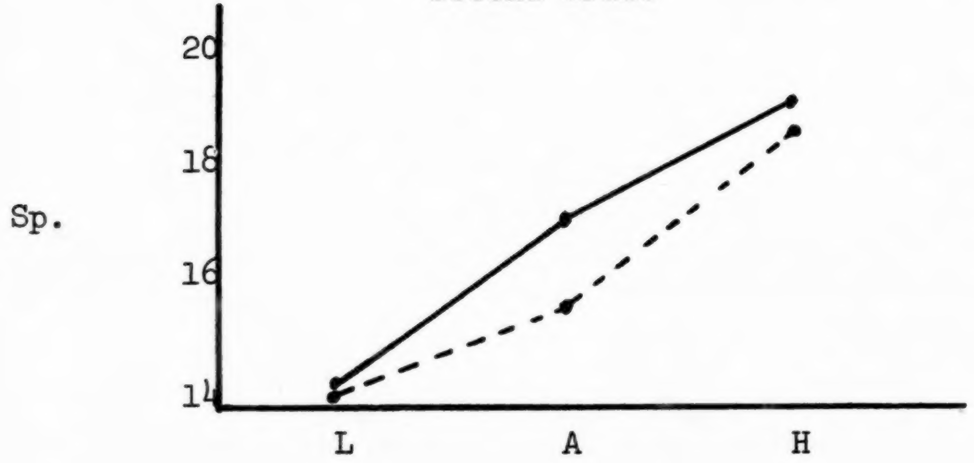


Figure A14 Relationship Between Treatment And I.Q. On Spelling Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

*Without Kindergarten

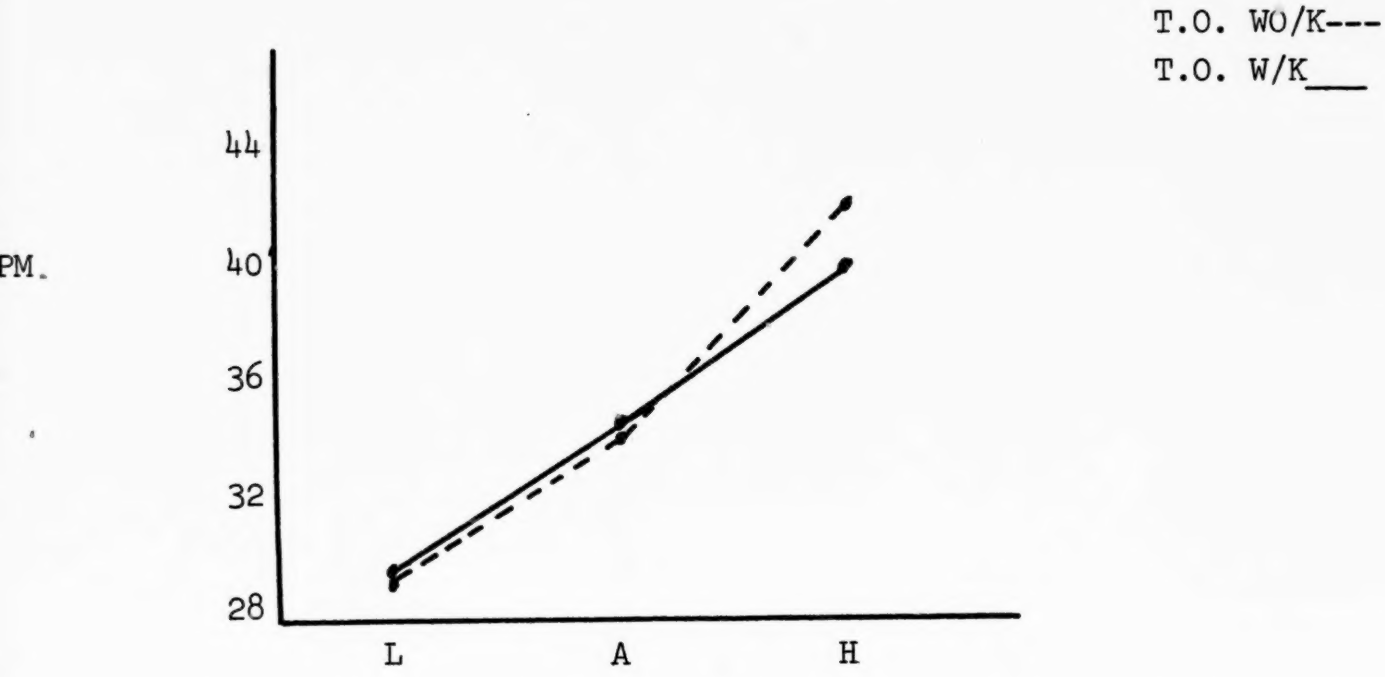


Figure A15 Relationship Between Treatment and I.Q. On Paragraph Meaning Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

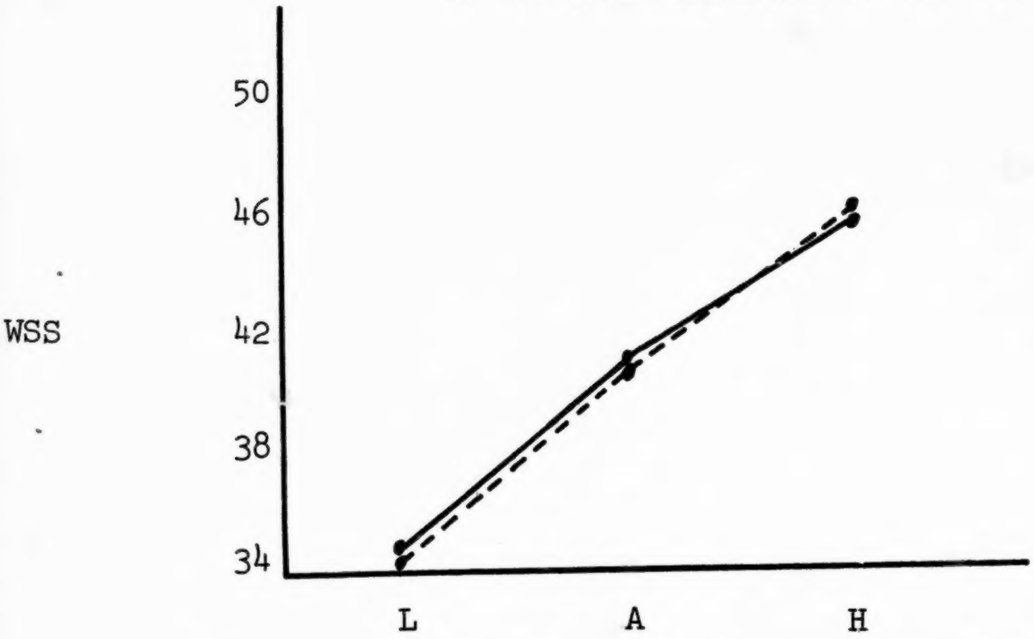


Figure A16 Relationship Between Treatment And I.Q. On Word Study Skills Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

i.t.a. WO/K---
i.t.a. W/K___

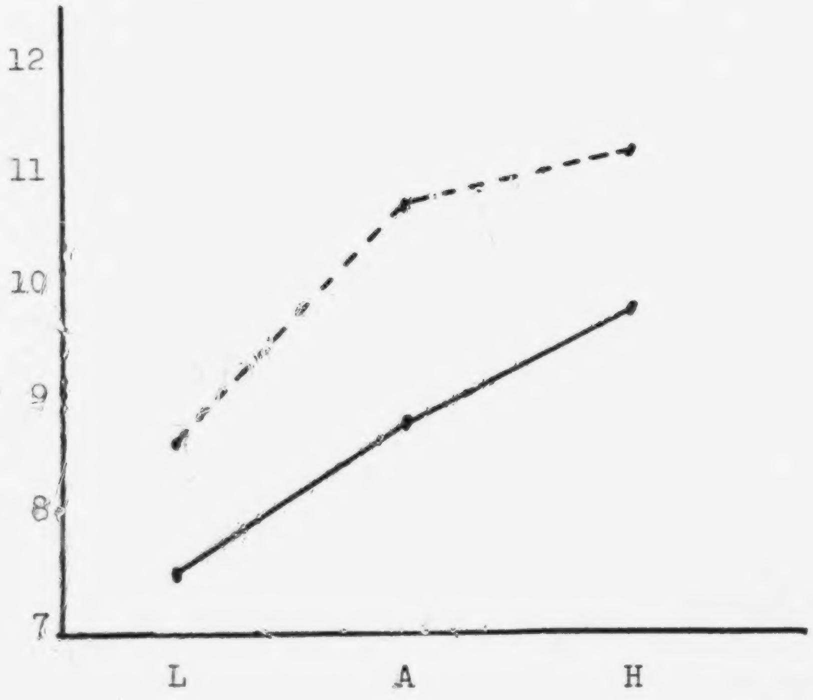


Figure A17 Relationship Between Treatment And I.Q. On the Composite Reading Score (Word Meaning, Paragraph Meaning, Word Study Skills) Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

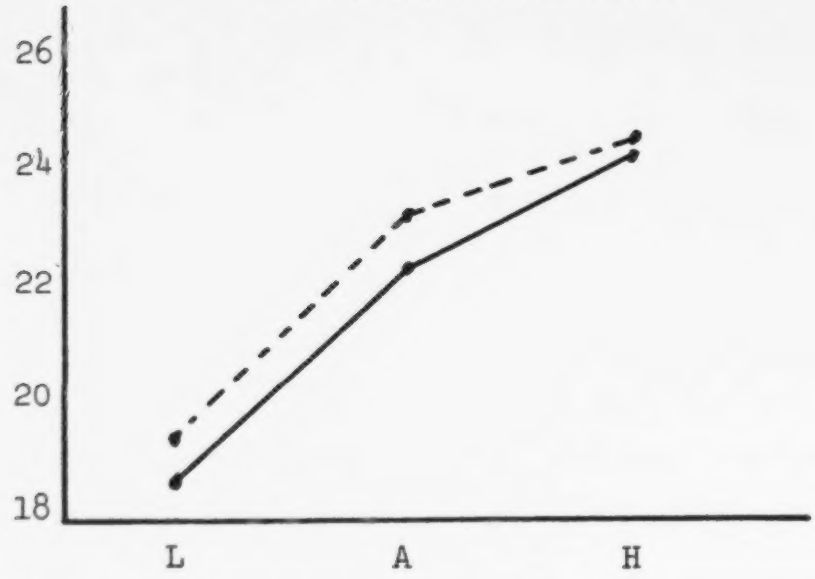


Figure A18 Relationship Between Treatment And I.Q. On Word Meaning Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

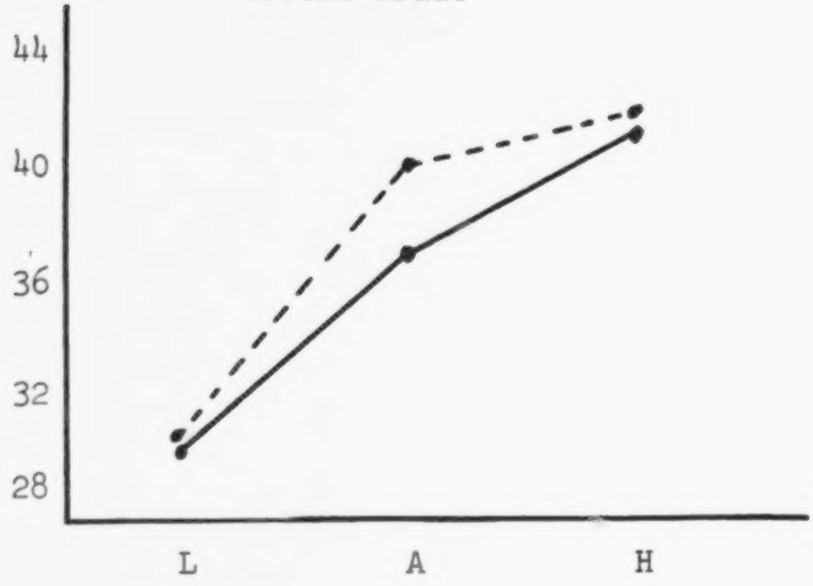


Figure A19 Relationship Between Treatment And I.Q. On Paragraph Meaning Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

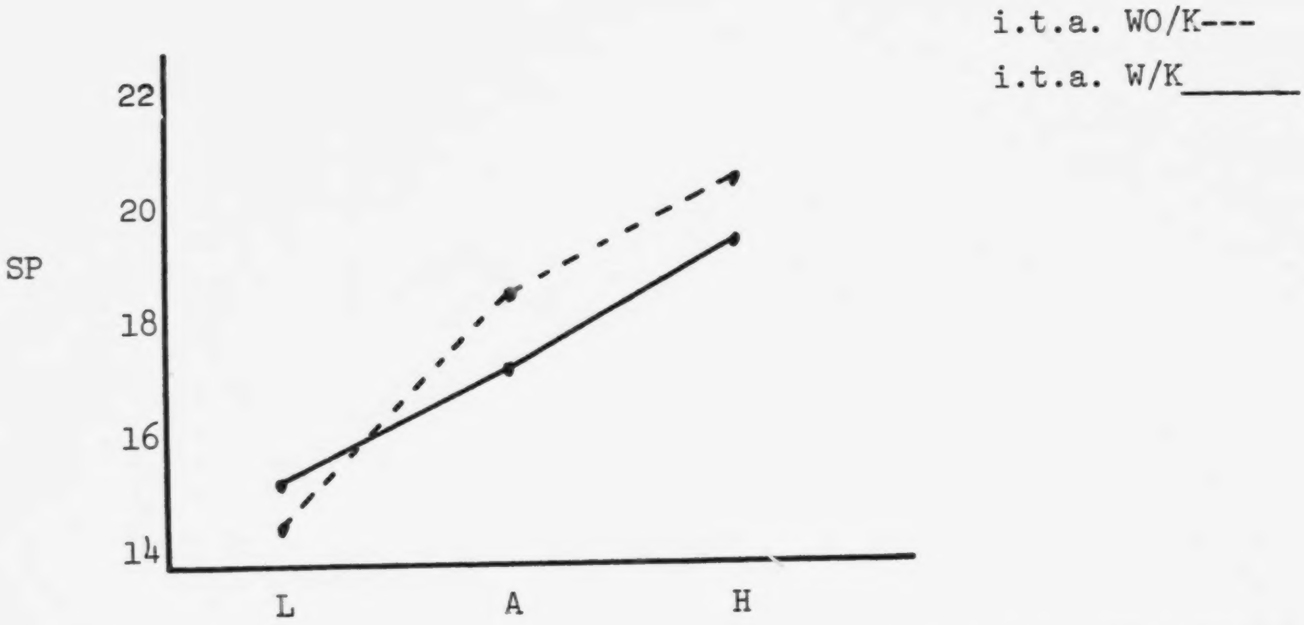


Figure A20 Relationship Between Treatment And I.Q. On Spelling Subtest Of The Stanford Achievement Test, Primary II, At The End of Second Grade

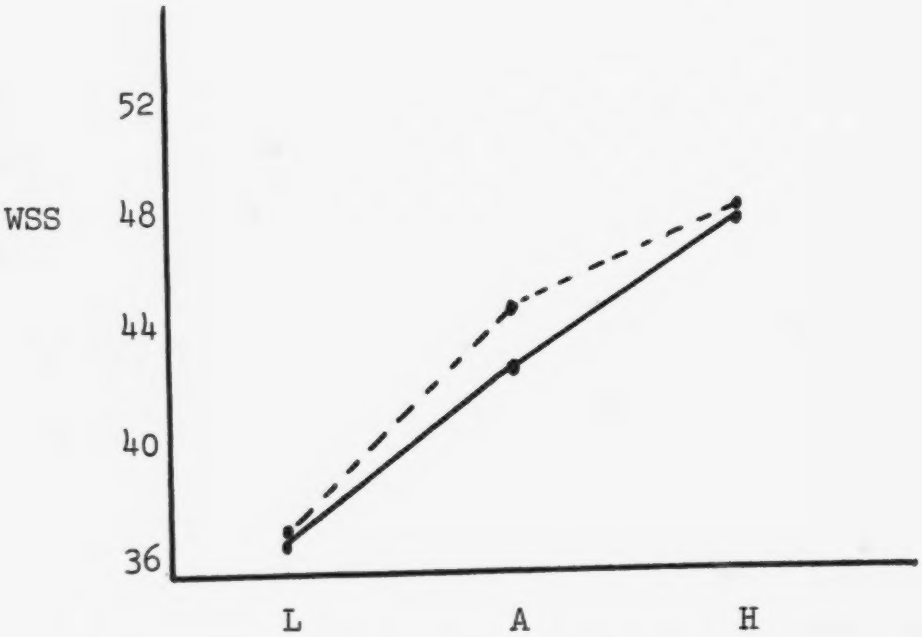


Figure A21 Relationship Between Treatment And I.Q. On Word Study Skills Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

i.t.a. WO/K---
T.O. W/K___

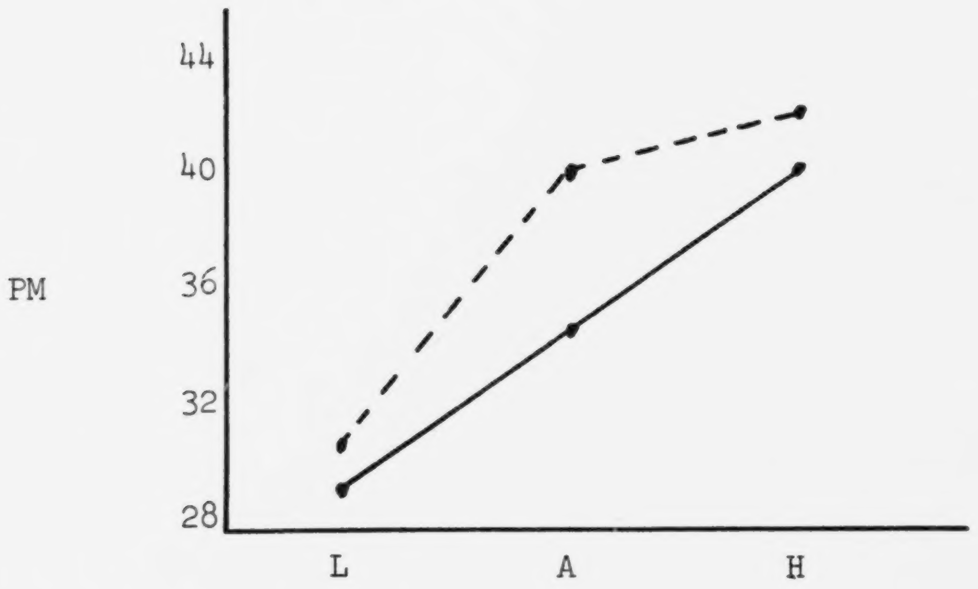


Figure A22 Relationship Between Treatment And I.Q. On Paragraph Meaning Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

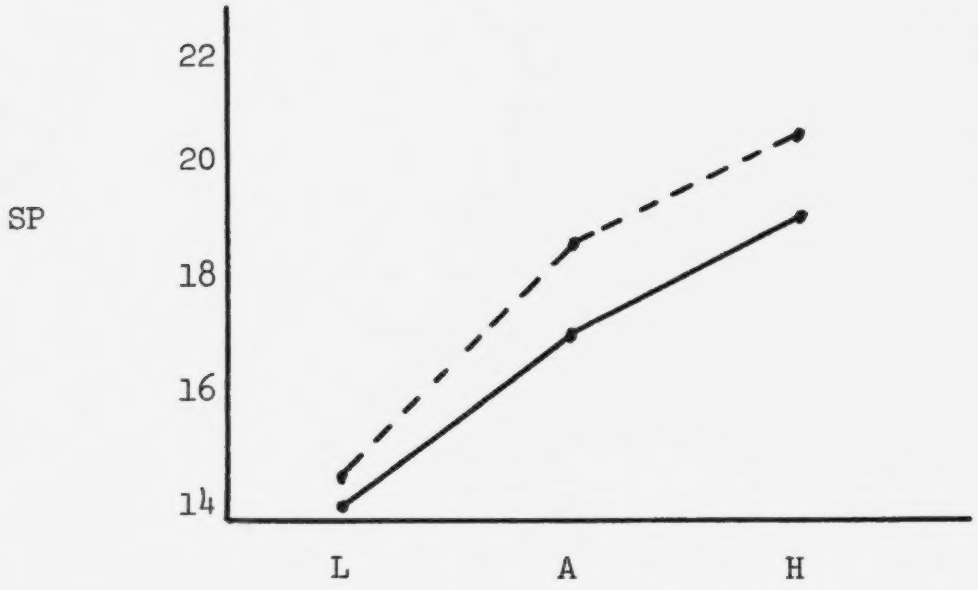


Figure A23 Relationship Between Treatment And I.Q. On Spelling Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

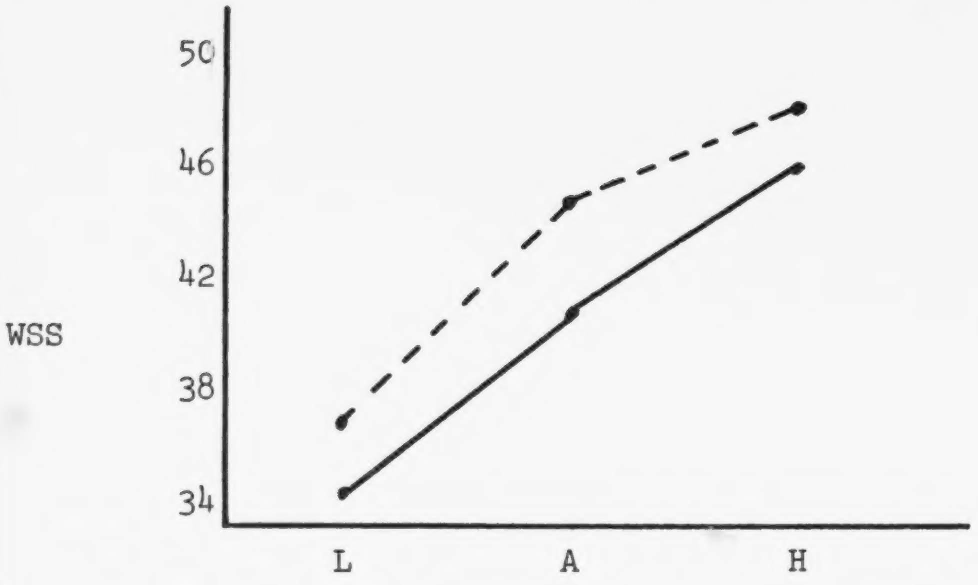


Figure A24 Relationship Between Treatment And I.Q. On Word Study Skills Sub-Test Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

i.t.a. WO/K---
T.O. W/K___

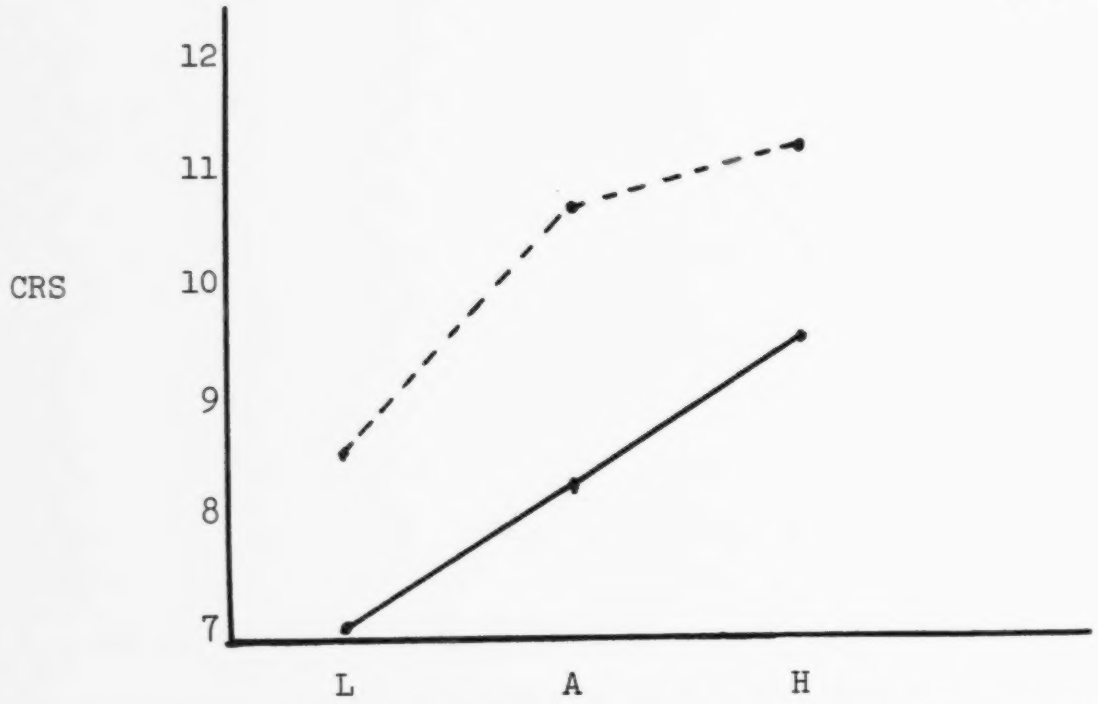


Figure A25 Relationship Between Treatment And I.Q. On The Composite Reading Score (Word Meaning, Paragraph Meaning, Word Study Skills) Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

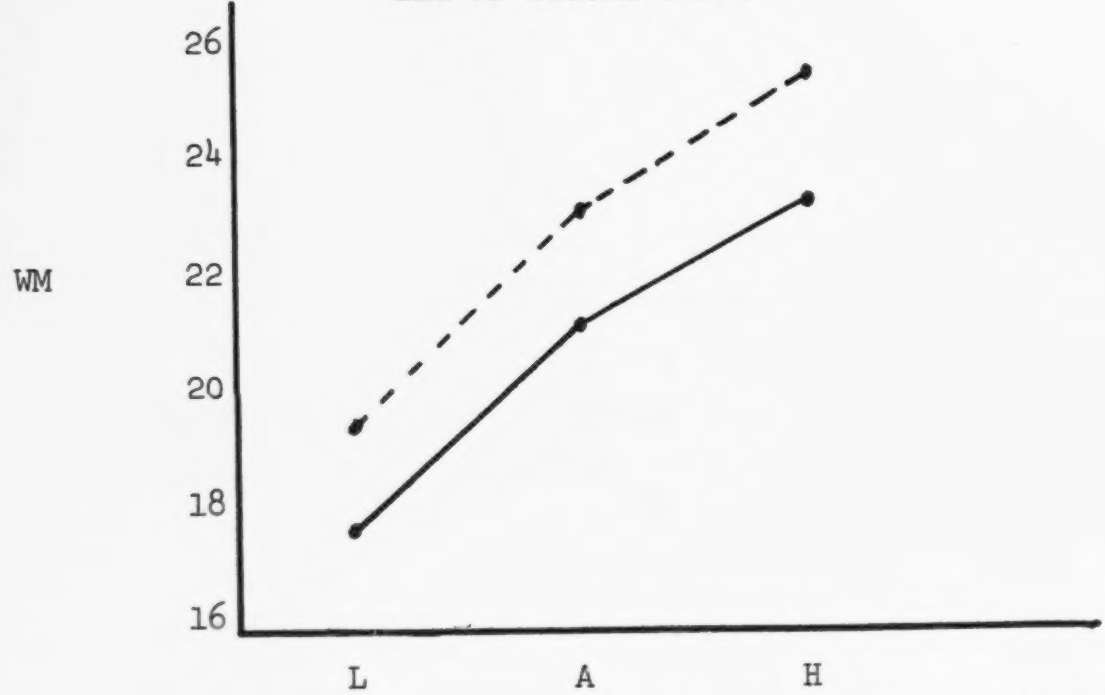


Figure A26 Relationship Between Treatment And I.Q. On Word Meaning Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

T.O. WO/K___
i.t.a. W/K---

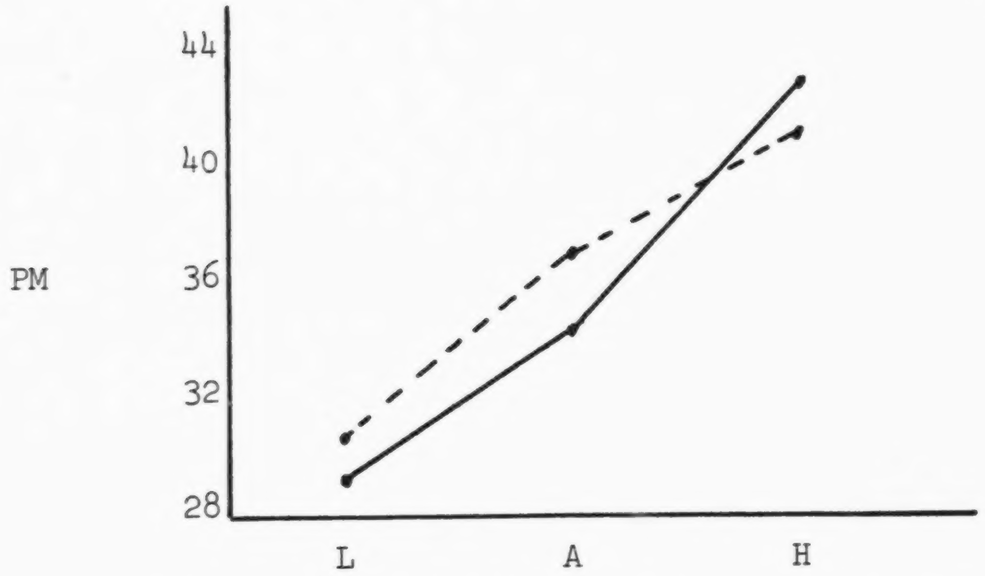


Figure A27 Relationship Between Treatment And I.Q. On Paragraph Meaning Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

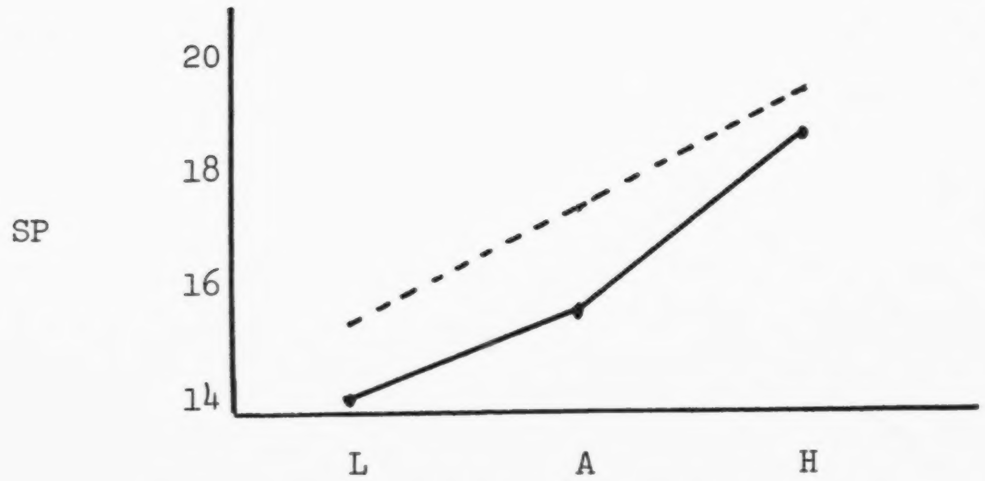


Figure A28 Relationship Between Treatment And I.Q. On Spelling Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

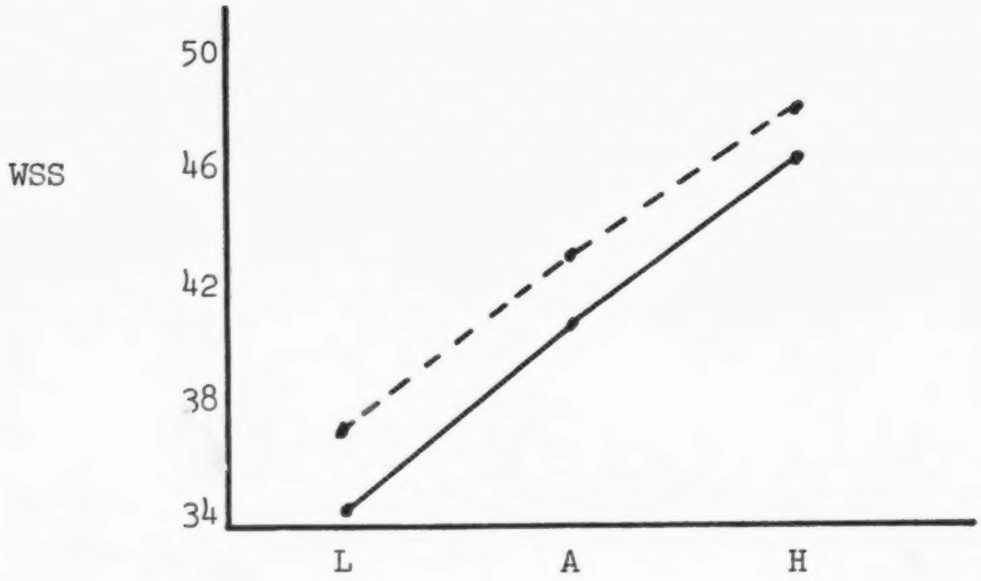


Figure A29 Relationship Between Treatment And I.Q. On Word Study Skills Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

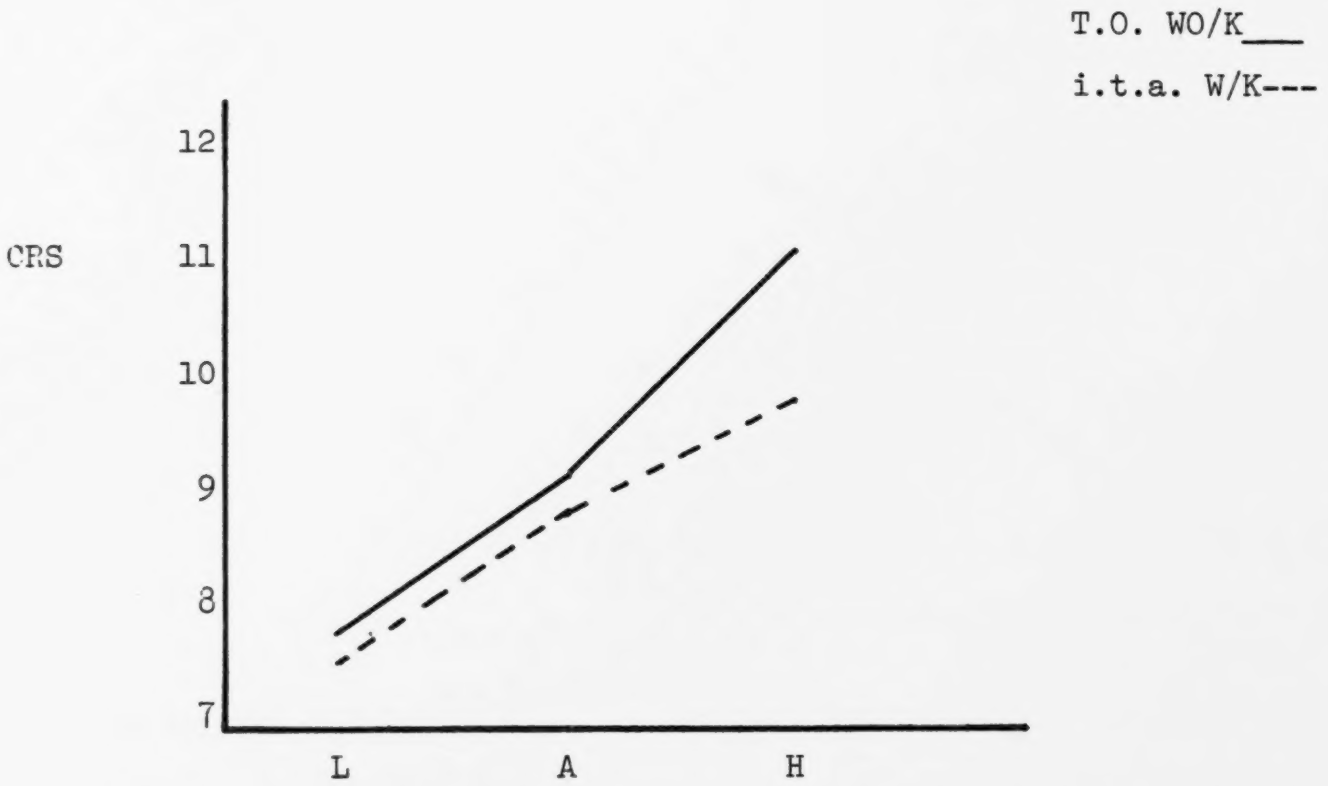


Figure A30 Relationship Between Treatment And I.Q. On The Composite Reading Score (Word Meaning, Paragraph Meaning, Word Study Skills) Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

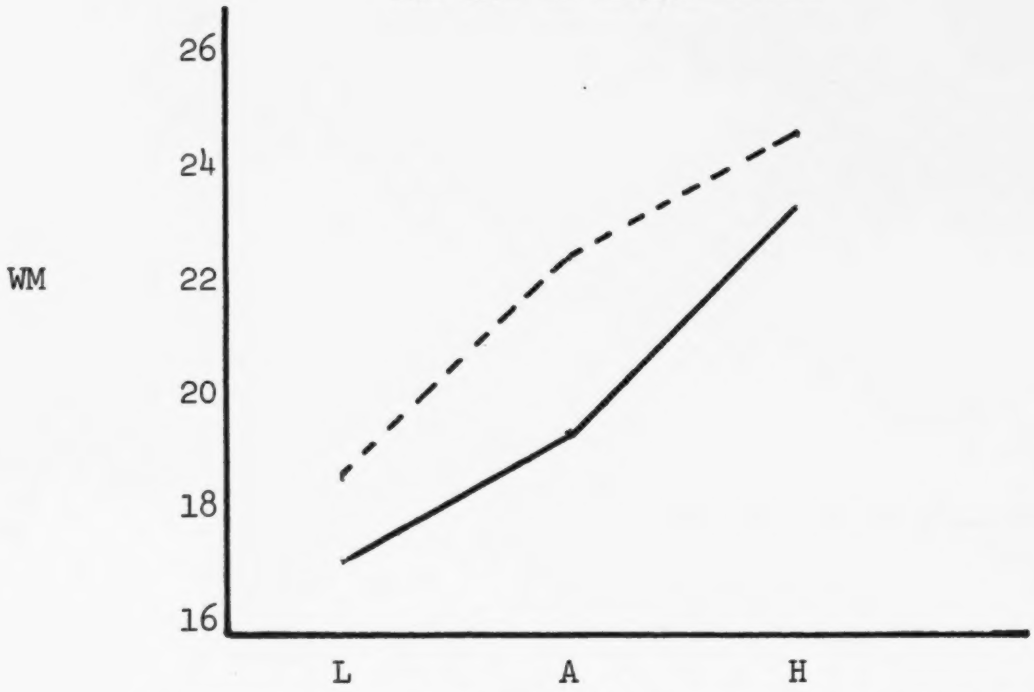


Figure A31 Relationship Between Treatment And I.Q. On Word Meaning Subtest Of The Stanford Achievement Test, Primary II, At The End Of Second Grade

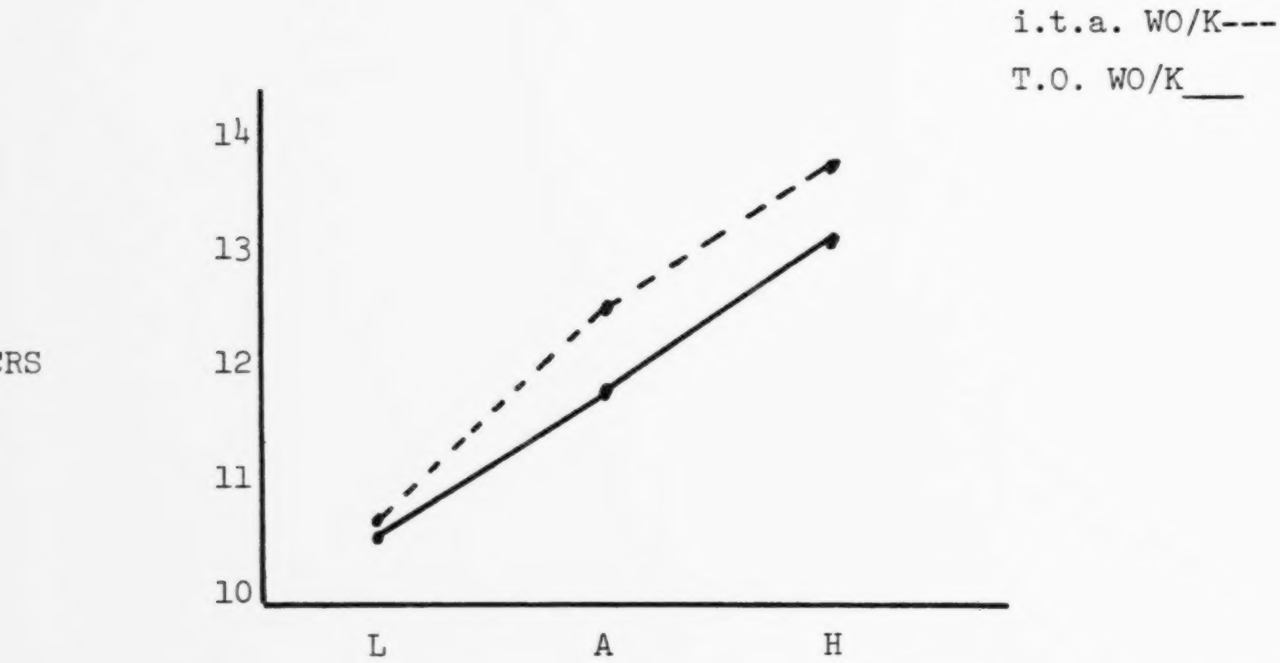
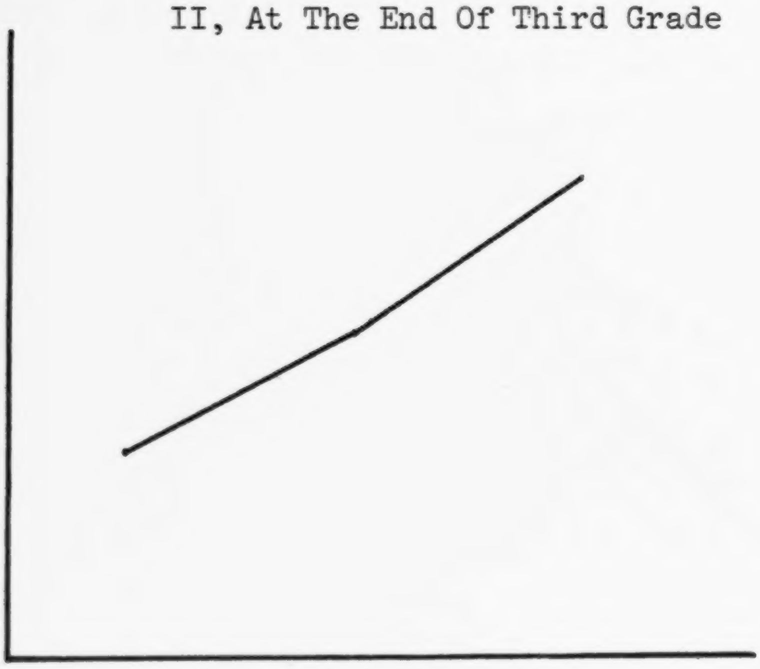


Figure A32 Relationship Between Treatment And I.Q. On The Composite Reading Score (Word Meaning, Paragraph Meaning, Word Study Skills) Of The Stanford Achievement Test, Primary II, At The End Of Third Grade



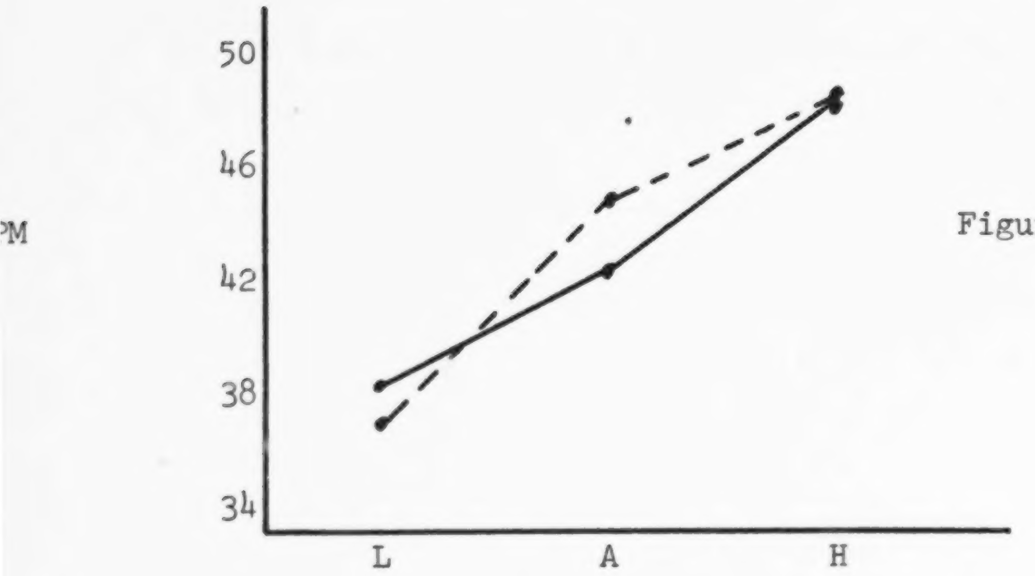


Figure A33 Relationship Between Treatment And I.Q. On Paragraph Meaning Subtest of the Stanford Achievement Test, Primary II, At The End of Third Grade

i.t.a. WO/K---
T.O. WO/K___

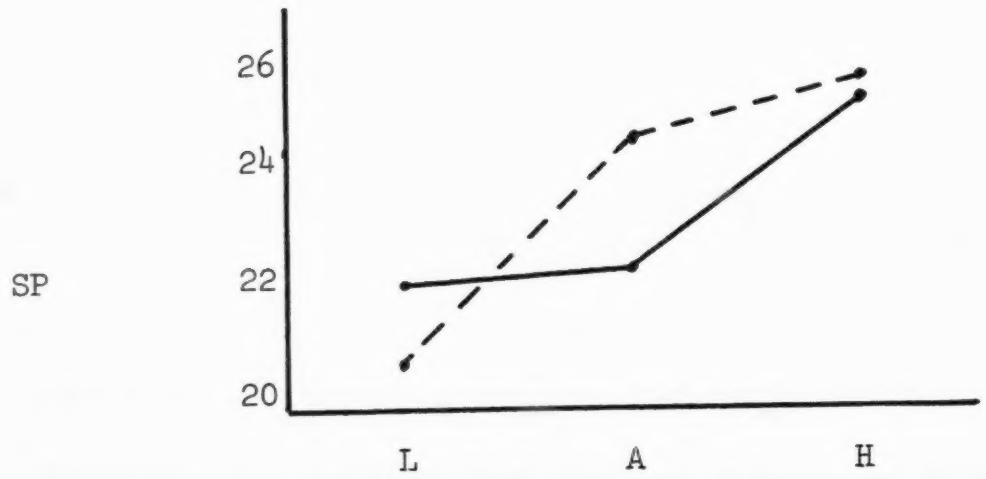


Figure A34 Relationship Between Treatment And I.Q. On Spelling Subtest Of The Stanford Achievement Test, Primary II, At The End Of Third Grade

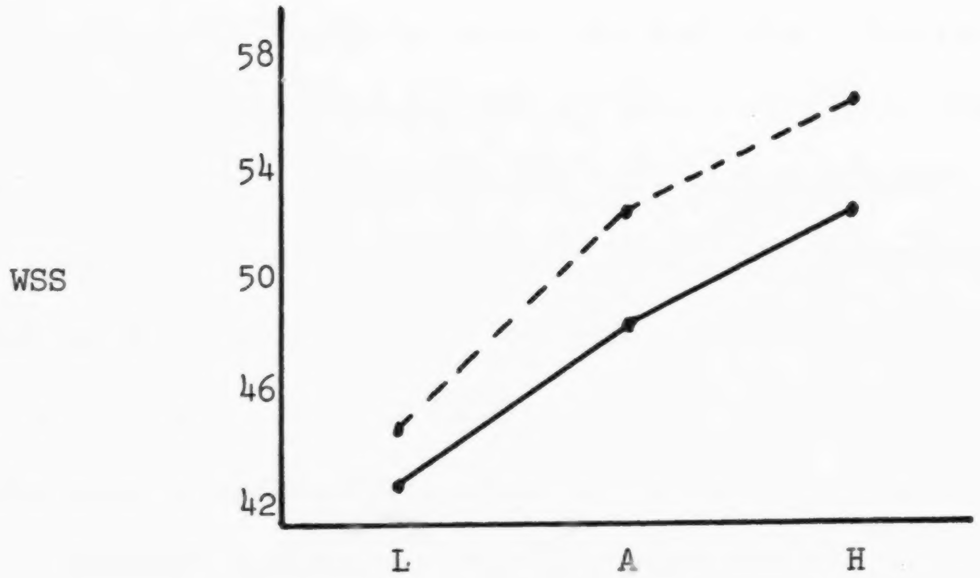


Figure A35 Relationship Between Treatment And I.Q. On Word Study Skills Subtest Of The Stanford Achievement Test, Primary II, At The End Of Third Grade

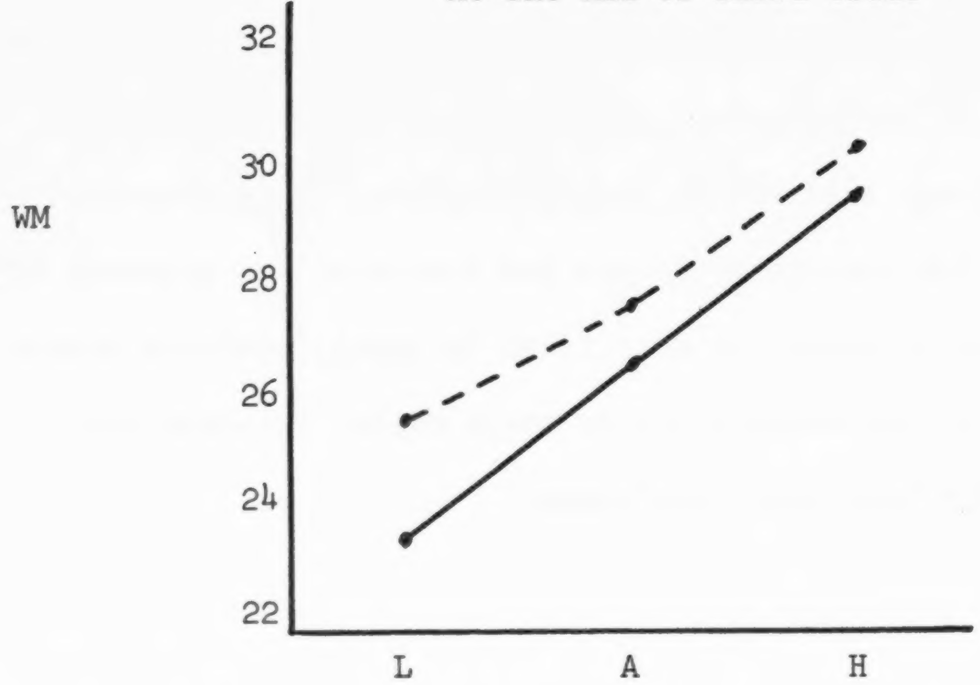


Figure A36 Relationship Between Treatment And I.Q. On Word Meaning Subtest Of The Stanford Achievement Test, Primary II, At The End Of The Third Grade

# APPENDIX Q

## ANALYSIS OF QUESTIONNAIRES ADMINISTERED IN FOURTH YEAR OF THE STUDY, 1967-1968

### Questionnaires

During the second and third year of the study, questionnaires were prepared to be administered to parents and teachers in order to supplement the objective data obtained through test results with the subjective impressions of those involved in the project. The results of those questionnaires revealed that there was a high degree of acceptance of the use of i.t.a. by parents and teachers. Although some reservations were stated the overwhelming majority were either favorable to the i.t.a. program or favorable with reservations. Questionnaires were not distributed in the previous year of this study since the results of the first two years had correlated so highly. Thus, it was felt that questionnaires could be eliminated in the third year of the study but that they would be readministered in the final phase of the study to determine whether the subjective responses of parents, teachers, administrators, and the research officers has changed markedly from the original, favorable impressions. In this final stage those responding to the questionnaire have had an opportunity to observe the longitudinal effects of the program over a period of four years on the children involved in the study. Although it is recognized that the information obtained is far from scientific, and may even not be highly reliable, it is presented here as it was obtained for the reader to see and evaluate. In material of this sort it is dangerous to place too much faith in highly positive statements although, certainly, the absence of--or small number of--negative comments would undoubtedly have some importance.

## Research Officers' Questionnaire

The research officers in this study are employees of the school district in which the project took place. In almost all cases these people possess graduate degrees in reading and function as reading supervisors in their school systems. Questionnaire and results follow:

1. Did you feel that i.t.a. would be an unqualified success before you began the program?

   yes 0 no 7

2. Did you feel that i.t.a. would be unsuccessful before you began the program?

   yes 0 no 7

Hence, it would appear from questions 1 and 2 that the research officers approached the study with a relatively open mind and although they may have had reservations, they were certainly not convinced of the success, or lack of success, that would be obtained from such a program prior to its inception.

3. Were you skeptical before you began the program?

   yes 4 no 3

The general comments to this question reflect the fact that skepticism was the result of two general concerns: the problem of transition and the effect that i.t.a. might have upon spelling.

4. What is your present attitude toward i.t.a.?

   more favorable 5 still skeptical 0
   less favorable 0 unchanged from question #1 2

5. For reservations listed in question 3, list your present attitude for each reservation listed. Some of the general comments in this area were:

"very successful but some difficulty with material for slow-learners,"

"equal to T.O.-trained children," "transition still difficult for very slow students," "spelling is not really affected."

6. What was the attitude of your instructional staff prior to the beginning of the study?

very favorable some
favorable with reservations 6
unfavorable with reservations some
unfavorable 0

Six of the research officers on question 6 reported attitude of their instructional staff was favorable with reservations prior to the initiation of the study. One of the research officers, however, felt unable to pick any one of these categories and reported that some of his teachers were very favorable and some of his teachers were unfavorable with reservations. Hence, the seeming inconsistency on those two categories.

7. What is the attitude of your instructional staff at the present time?

very favorable 2
favorable with reservations 5
unfavorable with reservations 0
unfavorable 0

8. What is the attitude of your instructional staff not engaged in i.t.a.?

very favorable 1
favorable with reservations 4
unfavorable with reservations 0
unfavorable 0

9. Have any teachers who were not in the study requested assignment to i.t.a. classes?

yes 3
no 3

10. Have any teachers who taught with i.t.a. requested to return to teaching with traditional orthography?

yes 1 no 6

11. Parents' acceptance of the program has been

favorable 6 , unfavorable 0 , other 1

12. Have you encountered any difficulty with members of the Board of Education who have expressed disapproval of the program?

yes 0 no 7

13. Have you continued to use i.t.a. as the medium of instruction in beginning reading in your school?

yes 6 no 1

14. If you were given complete option as to how you would handle beginning reading instruction, would you want all of the first-grade classes to be instructed in i.t.a.?

yes 2 no 5

Here are some of the sample comments related to question #14:

a. Some teachers preferred T.O. approach to reading. They could continue to do so.

b. Half i.t.a.--half T.O.: there are those for whom i.t.a. is not suitable in terms of phonic emphasis and learning and unlearning.

c. I'd like more research on what kind of child works best with this new medium.

d. At present we are beginning 40% of our first-grade classes and continuing the study.

15. Do you feel that the children who were instructed in i.t.a. are reading better than _______, as well as _______, worse than _______ children who were instructed in T.O., regardless of the test results?

Four reported better than; three, as well; none, worse.

16. Do you feel that the writing (written composition) of children who were instructed in i.t.a. is better than ______, as good as ______, worse than ______ that of children who were instructed in T.O. regardless of test results?

    Six reported better than; one, as well; none, worse.

17. Have you observed any specific difficulties in making transition from i.t.a. to T.O.?

    One research officer reported yes; six reported no. The research officer who reported yes stated that he observed some difficulties in transition with children who were slower intellectually.

As can be seen in the above report, the research officers are generally favorable toward i.t.a. and toward the progress made by i.t.a. children. In summary, they seem to report that there is general teacher satisfaction with the program, no difficulties with boards of education, general acceptance by parents, and progress on the part of the children which is as good as or better than that which they have seen in the past. It should be noted, however, that these people are professionals in the field of reading and their statements, although positive, are certainly not unqualifiedly so. There were some dissatisfactions noted and many of these people still felt some reservations toward the program. It is especially significant to note that very few of the research officers would be willing to put the i.t.a. program into all of their first-grade classes.

### Principals' Questionnaire

The principals' questionnaire was precisely the same as that administered to each of the research officers. Hence, each of the questions will not be repeated in this report. However, the results to each question will be given and the reader may refer to the above section by question to determine to what the principal is responding. On the first question there was one yes response, and nine no responses; and to the second question, no yes responses and eleven no responses. This would seem to reflect the fact that the principals view the project in the same way that the research supervisors' viewed the project originally, with one exception who felt that the project would be unqualifiedly successful before he initiated it. Thus it would appear that the principal, as well as the research officers, generally approached the study with an open mind. On the third question, 58% of the principals reported yes and 5% reported no, which suggests that there was a high degree of skepticism about the project prior to its initiation. Some of the comments of the principals which reflect their skepticism are:

a. "Didn't believe claims, e.g., first ones out of Bethlehem, Pennsylvania.

b. "Concerned with transition and spelling in regular orthography."

c. "I didn't feel there was sufficient research in the United States. I thought the reading materials would be too difficult for primary children."

d. "I was concerned with carry-over into the upper grades."

e. "A general skepticism which prevails whenever an unproven method is applied to teaching and learning."

f. "Lack of knowledge of program--had a great deal of respect for T.O."

It can be seen from the above comments that many of the principals had rather serious reservations about the success of the project although they still were not convinced of its inability to succeed, or certain that it would not succeed.

On the fourth question, eleven of the principals stated that their present attitude toward i.t.a. is more favorable than it was initially. There were two that were still skeptical and one whose opinion had unchanged from the first question. The principal whose opinion had not changed was the principal who was highly certain of the success of the i.t.a. program prior to its inception.

On the fifth question, principals were asked to list present attitudes toward the things which had made them skeptical before the project had begun and the following are some of their responses.

a. "Bethlehem itself seems to have found different results as the study progressed."

b. "No problem with transition--slow children just need more time and spelling is no problem."

c. "It's a vehicle for some children--not all. How to differentiate prior to placing child into it is still a problem. Leaves little room to change child from one group to another and use still not widespread enough to accommodate child who moves."

d. "Fears and concern were dispelled by proven results they can do it."

On the sixth question, three principals reported their instructional staff prior to the beginning of the study as being very favorable, with reservations, and one, unfavorable with reservations. When compared to question 7, a direction of change toward a more favorable position may be noted as seven of the principals reported their teachers as being very favorable, five reported their teachers as being favorable with reservations, and none reported their teachers as being unfavorable with or without reservations at the present time.

The eighth question dealt with the attitude of those teachers who were not engaged in the project. In this area, the principals report one teacher as being very favorable, nine, as being favorable with reservations, one, unfavorable with reservations, and one teacher would not commit herself to any of the categories. Despite the fact that principals view their teaching staff as having become more favorable toward the use of i.t.a. as an instructional medium, on question 9, this is not strongly reflected, although there certainly is some evidence of a more favorable position being taken by their teaching staff, as four of the principals report teachers as requesting assignment to i.t.a. classes. But it is significant to note that nine of the principals report that none of their teachers have requested assignment to the i.t.a. classes.

It is also significant to note in question 10 that three principals report teachers as requesting transfer back to traditional orthography classes after having taught i.t.a.; whereas eleven of the principals report that none of their teachers have requested reassignment to T.O. classes.

In terms of the reaction of the parents to the program, ten principals report the parents' reaction as favorable and one stated that there were many reservations and mixed reactions although some liked it quite well. The only comment that occurred to that question was the statement that early concerns have disappeared. Most feel the program is a good one. In addition to a general acceptance on the part of parents, the boards of education have obviously approved of the program as well, as none of the principals reports having any difficulty with members of the board of education and thirteen report that no difficulties were encountered with board of education members who disapproved of the program.

On question 13, eleven of the principals report they are still using i.t.a. as the medium of instruction in beginning reading in their schools while one did not. It should be pointed out, however, that although eleven principals report continuing with i.t.a. in their schools, two have reduced their groups so that the number of first-grade classes in i.t.a. is smaller than it was at the inception of the study, and in one case a principal has maintained only one class in i.t.a.

On question 14, five principals stated they would like to have all of their first-grade classes instructed in i.t.a., but a majority of seven stated that they would not. One principal stated that he would prefer to see half of his first grades in traditional orthography using the Lippincott program and another stated that he would like prior testing to see if each child can handle i.t.a. and fit a program specifically to each child's ability.

On question 15, three of the principals feel the children who were originally instructed in i.t.a. are reading better than children who were instructed in T.O.; whereas eight feel that children instructed in i.t.a. are reading as well. There are none who feel their children instructed in i.t.a. are reading worse than those who were instructed in T.O.

On question 16, twelve of the principals report that their children write better than children who had been instructed in T.O., and one felt the i.t.a.-instructed children wrote as well as, but not better than, T.O.-instructed children. None of the principals felt the i.t.a.-instructed children worte worse. An examination of questions 15 and 16 are rather interesting in that they certainly do not reflect unqualified acceptance of i.t.a. as a program, and there does not seem to be a general feeling that the i.t.a.-instructed children were better readers. However, the writing ability of children instructed in i.t.a. seems to be uniformly noted by virtually all the principals--suggesting that many of these principals felt that the benefits of i.t.a. were more observable in the writing area than in the reading area.

On question 17, which dealt with transition, three principals felt that some difficulty in transition did occur, and nine felt that transition was not a problem at all. The comments on question 17 were:

a. "Slow children encountered difficulties only in transition to T.O. writing."

b. "Second-grade teachers have tendency to hurry the transition of slow pupils."

Generally, in viewing the reports of the administrators and the research officers, it may be seen that their attitudes toward i.t.a. are favorable, although there certainly are reservations reported by virtually all of these professional educators. Despite four years in the project, many of them feel that continued research should take place and that there should be increased differentiation of instruction and improved diagnostic procedures which will enable individuals to differentiate those who would be more successful in i.t.a., and those who might profit by instruction in other media.

Third-Grade Teachers' Questionnaire

At the time of final testing, third-grade teachers were given a list of those children in their classes who were part of the project. They were informed at that point which of these children had originally been instructed in the i.t.a. medium. They were then given a questionnaire in which they were to report their impressions of the progress and achievement of those children in their class who were in the original i.t.a. group.

On question 1, "Do you feel that the children in your present class who had been instructed in i.t.a. in first grade read better than _______, as well as _______, worse than _______ children in previous classes who had been instructed in traditional orthography?", 24% of the teachers reported that their i.t.a. children read better than children in previous classes who had been instructed in T.O. Sixty-four percent read as well as previous T.O.-instructed children and 2% felt that their children had read worse. Nine percent did not respond to the question because there were no children in their classes who had been instructed in i.t.a., or they felt they were unable to answer the question.

On the second question, "Have bright, average, and/or slow pupils who were in i.t.a. classes made more progress in your class than those who learned with conventional orthography whom you have taught in the past?", 22% of the teachers answered yes, 62% of the teachers answered no, and 13% did not respond Some of the comments reported by the teachers on question 2 were these:

a. "The progress has been approximately the same if the T.O. program is heavy on phonics."

b. "The brighter children have progressed a little further--slower children just as slow."

c. "Some of the i.t.a. children would have benefited more from their reading if the pace in reading had not been so rapid. These children really do not understand what they are reading."

d. "All of my i.t.a. students are bright and have made very good progress this year. However, I can't say that their progress is any more outstanding than that of bright students taught in the past."

e. "Perhaps coincidentally but my i.t.a. group is mainly among the slower readers. The areas and the extent of their difficulty seems similar to prior years. Greater freedom of expression is apparent this year."

f. "Of the eight i.t.a.-trained children in my class I consider five to be poor readers and students. This is probably coincidental."

g. "Except for one who reads above average all the other students read below average level."

h. "Only two in class had i.t.a. One is a poor student; the other is average."

i. "Have three reading groups. There are i.t.a.'s in all three groups. Progress seems to follow I.Q. score and emotional state."

As can be seen in the above comments, the majority of teachers do not see any great advantage in reading for children who have been instructed in i.t.a. It can be seen from the general comments that when a child is doing well in reading, they are not willing to attribute this to i.t.a. as they have had previous children who had been instructed in T.O. who have done as well. There seems to be a number of teachers who report that i.t.a.-instructed children exhibited difficulty in comprehension. On the third question, "Has your attitude toward teaching reading changed?", 22% of the teachers answered yes, 71% answered no, one teacher felt she was not able to answer it, placing a question mark down beside the question, and two teachers did not answer it at all. Some of the comments to question 3 were:

a. "Any approach which eliminated beginning reading difficulties for able children should be employed."

b. "Realize the children can do more basic reading than previously."

c. "My reading lessons are not as structured and limited as they were in the past."

d. "To some extent the program is more flexible--allowing for greater reading freedom and choice of reading materials."

e. "I've always enjoyed teaching reading for the most part. Too, the children have been responsive."

f. "I enjoy teaching reading even more than I did before."

g. "I still believe reading should be an integral part of every subject."

h. "I devote more time to reading and am more aware of skills involved. Can relate better to other curriculum areas."

i. "I have found it necessary (and rewarding) to adopt an individualized reading program due to the vast differences in reading patterns of children coming through i.t.a. programs."

Hence, some of the teachers who report that their attitudes have changed seem to feel that the possibility of change was the result of previous i.t.a. instruction, while others, and in this case the majority of teachers who report attitudinal changes, seem to be showing the normal kinds of growth and change which could be attributed to increased experience in teaching.

On question 4, "Have your teaching procedures changed?", 44% of the teachers answered yes and 22%, no. Two percent put down a question mark and 4% did not answer. Some of their comments on question 4 were:

a. "Grouping for skills is needed by individuals (by-product of interesting conference day)."

b. "More independent work assigned."

c. "Children do more work independently."

d. "I find myself more eager to enrich the reading program."

e. "We do not have as much minutiae to contend with. The perspective for teaching is broader, more realistic and more exciting and challenging to the pupils."

f. "More varied material rather than limited to basal text."

g. "Not as a result of i.t.a. but grouping procedures used in our school."

h. "More use of audio-visual materials and comprehension training."

i. "Lessons planned differently in some instances--word attack [illegible]ls area especially."

j. "More independent work for the brighter pupils."

As can be seen from the above, some of the attidues seem to have changed as a result of the conference day. A few attribute changes in teaching procedure which might be attributed to the early i.t.a. instruction. The vast majority report changes which again could be attributable to normal teacher growth as a result of increased experience.

On question 5, "Would you prefer to continue teaching children who have been taught with i.t.a.?", 36% answered yes, 20% answered no, 33% stated it doesn't matter, 9% did not respond at all, and one teacher placed a question mark beside the question. It would seem, from the answer to this question, that we have close to an even split among the teachers with approximately one-third reporting they would like to have previously instructed i.t.a. children in their classes, approximately one-third who feel it really didn't matter, and a still sizable 20% who state they would not want children who had been instructed previously in i.t.a. in their classes.

On question 6, "Do you think all first-grade children should be taught in i.t.a.?", 29% of the teachers responded in the affirmative and 52% responded in the negative, 2% felt it didn't matter, 9% did not respond, and 4% just placed a question mark beside the question. For those who responded no to question 6, their comments on which children should be excluded follow:

a. "Children who find reading an easy skill to master do not really need it."

b. "Children that resist change--some children still haven't made a complete transition in spelling."

c. "Bright and average children can succeed in either approach, I believe. I like what I've seen of the linguistic approach also."

d. "Question in my mind about some of the poorer readers but since I've just worked with children from i.t.a. for one year, have no firm conclusion as yet."

e. "There is no one method that can be used to teach reading to all children. Various approaches are necessary, depending upon child."

f. "Those with good verbal expression--those encountering no difficulties with reading readiness."

g. "I think teaching is a matter of quality. Many approaches may have to be used. Some children will respond to one and not another. Do not think there is a panacea or cure-all for every child."

h. "Children with emotional difficulties and perceptual problems. Also poor coordination."

i. "Slow learners."

j. "Lower third."

k. "Those with perceptual difficulties."

l. "I think slow children find it more difficult."

m. "I do not believe that i.t.a. is the only best way to teach."

n. "The slower children do not seem to benefit from i.t.a. as much as the brighter ones."

On question 7, "Have you received any complaints from parents about i.t.a. or the program?", 33% reported yes and 67% reported no. The general comments to question 7 reveal the fact that those parents whose children are having problems with reading tend to blame i.t.a. for this problem and a number of parents whose children were encountering difficulties in spelling also tended to blame i.t.a. for this weakness. Generally, it would seem that parents tend to use i.t.a. as a scapegoat when difficulties occur, but it still should not be forgotten that the majority of teachers report that they have had no complaints from parents about i.t.a., and a number of teachers in their comments report that the parents of i.t.a. children in their classes were highly enthusiastic toward the program.

On question 8, "Have you been subjected to more pressure from the administration this year than previous years?", 9% reported yes and 87% reported no, and 4% did not answer.

On the ninth question, "Did you get more guidance or help from your supervisor this year than you previously received?", 2% answered yes, 85% answered no, and 13% did not answer. This would seem to suggest the instructions given to the research officers to give no more than normal assistance was followed.

On question 10, "Were you supervised or observed more this year than in previous years?", 13% of the teachers reported yes, 80%, no, and 7% did not answer. The comments to this question generally reflected the fact that the Hofstra research increased the sample of time for observations this year to more accurately verify the teachers' logs.

On question 11, "Did you encounter any children from i.t.a. classes who had any difficulty in making transition in reading?", 18% of the teachers answered in the affirmative, and 82% in the negative. Comments on question 11 were requested in relation to any differences among bright, average, and slow children in making transition. These are some of the comments made by the teachers:

a. "Transition had already taken place."

b. "The slow children still have trouble and the brighter ones made it completely."

c. "Just one student--a slow one--has had trouble."

d. "I wasn't teaching in this school when transition was made. Some average children have still shown evidence of difficulty."

e. "These were children who would have had trouble in any case."

f. "All of the children in i.t.a. were in my top reading group and one at the top of the second reading group. Also one at the bottom of the second reading group. Comprehension poor.

g. "Bright have already changed over in second. Slow can't read well but read traditional."

Most of the above comments reflect the fact that i.t.a. children made transition in second grade and it would seem that there were certainly not a large number of children exhibiting difficulty. There was some tendency on the part of teachers to report that some children occasionally reverted back to i.t.a. in spelling and in writing when children were in the average- or slow-reading groups. From the comments, however, it did not seem that this was a major problem as the vast majority of comments indicated the children had made transition before the third-grade teachers saw them.

On question 12, "In your present class, did you encounter any children from i.t.a. classes who had any greater difficulty in spelling than those from T.O. classes?", 44% of the teachers reported in the affirmative and 54% in the negative. Two percent did not answer. Some of the sample comments on question 12 follow:

a. "Slow learners have more trouble with spelling."

b. "Children average and low ability range spell incorrectly at a frequent rate."

c. "Some children still spell phonetically."

d. "My two brightest children and best spellers and readers were not in the program. Of the two slowest, one was not in the program and one was."

e. "The slower children still have trouble with spelling and the fast groups are good spellers."

f. "The slower i.t.a. children had greater difficulties in spelling but also in other subjects than the average and brighter children."

g. "Differences seem greatest among average children earlier in year but have leveled off later. The brighter rarely revert to i.t.a.--the slower do, often, and the average spell well on tests but sometimes poorly otherwise."

h. "Brighter children have larger vocabularies so more frequently reverted to i.t.a. when writing."

i. "i.t.a. children have a larger oral and written vocabulary and need more words. No differences in spelling of grade-level words."

The general comments on question 12 reflect a close to even split among the teachers on whether i.t.a. children have greater difficulty in spelling. A little less than half feel that they do and a little more than half feel that they don't. From the comments, it would appear that a number of the teachers are concerned about spelling, in general, for their entire classes and have noted among their slower children who had been instructed in i.t.a. a tendency to revert to i.t.a. spelling.

On question 13, "In your present class, did you encounter any children from i.t.a. classes who had any difficulty in creative writing?", 40% of the teachers reported in the affirmative and 56% reported negatively, 4% did not answer. These are some of the comments on question 13:

a. "This is because of differences in ability."

b. "Slow children are poor."

c. "The bright and average children do better."

d. "Children that found the transition difficult have general difficulties in many areas including creative writing."

e. "Children were freer in expressing themselves. This was of benefit to poorer readers."

f. "Only one seemed to show skill in creative writing. Others seemed very average and not very productive."

g. "Slow children were poor in expression and in spelling. Average were better; bright were able to work independently."

h. "Seemed freer to express themselves."

i. "Yes, slow children."

j. "Difficulty in creative writing was definitely related to the intelligence of the individual children."

k. "Bright children do extremely well; average about the same whether i.t.a. or not. Slow revert to i.t.a. spelling but still do not produce much.

In general, the comments to question 13 reflect the fact that intelligence is closely related to the writing ability of the child and that the bright children generally write better than those who are average or slow intellectually. There does not seem to be uniform agreement at this point that children originally instructed in i.t.a. write better than those children originally instructed in T.O. But it is significant to note that a number of teachers reported better productivity, better oral expression, and better written expression of i.t.a.-trained children.

On question 13a, "Do you feel that the written composition work of the children from i.t.a. classes is better than _______, as good as _______, worse than _______ the written composition of the children instructed in T.O.?", 29% of the teachers report that the writing was better than written composition of children instructed in T.O., 56% felt it was as good as, and 2% felt it was worse. Four percent did not answer and 9% reported same. Hence, again, it would appear there is not uniform agreement that i.t.a. children write better than those children who were instructed in T.O. There is, however, a vast discrepancy between those reporting better than and those reporting worse than for the i.t.a.-trained children.

On question 14, "Do the children in your present class from previous i.t.a. classes voluntarily engage in recreational reading more than _______, as much as _______, less than _______ those third-grade children instructed in T.O. originally?", 20% of the teachers reported more reading among previously trained i.t.a. children, 67% reported as much, and 9% reported less than the amount of reading of T.O.-trained children.

On the last question, teachers were asked to comment in six general areas related to reading, concerning the differences they observed between i.t.a. and T.O. children. For attitude toward reading, these are some of the comments:

a. "The slower learners realized their difficulties in relation to their classmates no matter what techniques their first introduction to reading has been."

b. "i.t.a.'s particularly brighter ones seemed to enjoy reading sooner than T.O. children."

c. "All read well and appear to enjoy their reading."

d. "Among both groups, some enjoyed reading as often as possible, others didn't care about reading library books or other reader."

e. "Some had more interest in outside reading, others did not."

f. "Children in i.t.a.- and T.O.-top groups enjoy reading; lower group i.t.a. and T.O. both dislike it."

g. "i.t.a. children enjoy reading more than T.O. children."

h. "Much greater enjoyment, independence and involvement is seen with i.t.a. children."

i. "Seem to be more positive among i.t.a."

j. "No difference."

k. "None of them seem to enjoy reading."

l. "Brighter and average children do better."

In general, the comments on attitude toward reading indicate what was found in question 14: that there are some teachers (approximately 20%) who feel that i.t.a. children have a better attitude toward reading and read more, but approximately two-thirds of the teachers did not report better attitudes but report that they are the same--or that there is no appreciable difference, or that attitudes reflect the degree of the child's success in reading.

The second area in which comments were elicited was in attitudes toward writing. These comments were:

a. "Same attitudes that they have towards reading."

b. "i.t.a. children look forward to writing more than the T.O."

c. "Five out of six show greater imagination and interest. They often write two and three page stories."

d. "On the whole, their attitude is highly satisfactory."

e. "No appreciable difference."

f. "Written communication is fluent and comes freely. Perhaps this is circumstance but i.t.a. children seem much more creative. Their papers are exciting to read."

g. "Enjoy story writing."

h. "i.t.a. children are more creative in writing stories and poems."

i. "Greater freedom of expression, enjoyment of sharing creative writing among i.t.a.'s."

j. "Unafraid of words, not held down by fear of misspelling."

In general, most of the teachers seem to feel that i.t.a. children's attitude toward writing was considerably more positive than those of their T.O. counterparts. The teachers in this case, of course, were not responding to the quality of a child's writing but to his desire to write as can be seen from the above comments which are representative of the total. Attitude toward writing seems much more positive among i.t.a. children.

The third area in which comments were elicited was word recognition skills. These comments were:

a. "Better i.t.a. children seem to be a little more adept at recognizing new words."

b. "i.t.a. children are less afraid to try to unlock an unfamiliar word."

c. "They have no difficulty recognizing words and attacking those they don't know."

d. "Recognition was very high for i.t.a. students; usually fair for T.O. students."

e. "i.t.a. slightly better."

f. "No difference."

g. "No appreciable difference."

h. "The same."

i. "i.t.a. good--better than T.O."

j. "About the same for both."

k. "Most are very good."

l. "Both are very good at word recognition."

m. "Little difficulty with recognition."

n. "i.t.a. child has great independence, competence in new word attack and word recognition."

o. "Do not hesitate over new words."

p. "Much better with i.t.a."

q. "No difference."

r. "No difference."

s. "Brighter and average do better."

t. "i.t.a. children not restricted to the vocabulary of one basal reader much more able to adapt to an individualized reading program."

In response to the development of word recognition skills, the teachers generally seem to feel that there is a superiority for the i.t.a. children.

The next area in which comments were elicited was in relation to comprehension skill. These comments were:

a. "Among slower learners, regardless of method, there is difficulty in comprehension skills."

b. "About the same."

c. "They show good understanding of what they have read. Too, are skilled at reading between the lines."

d. "Two out of nine i.t.a. students do extremely well in comprehension...the rest, fair. T.O. students do average to average plus."

e. "No appreciable difference."

f. "No difference."

g. "Very much the same."

h. "Some have little difficulty but on the whole, do well."

i. "Could be improved, especially where main idea and sequence are concerned."

j. "i.t.a. good."

k. "About the same."

Perusal of the comments relating to the development of comprehension skills reveals that very few of the teachers report that i.t.a. children have done better than T.O. children. The general feeling seems to be that there is some degree of equality between i.t.a. and T.O. children in comprehension with a few reporting better comprehension for i.t.a. children and a few reporting better comprehension for T.O. children. A few of the teachers report that comprehension seems to be closely related to the intelligence of the child.

On the fifth area in reading or related skills on which the teachers were asked to comment--the area of spelling--the comments were:

a. "Slower learners tend to be less adept at spelling T.O. or i.t.a."

b. "About the same for both groups."

c. "All are excellent spellers."

d. "Both groups are satisfactory--none outstanding."

e. "No appreciable difference."

f. "One child has never made transition to T.O."

g. "No appreciable difference."

h. "The same."

i. "Atrocious."

j. "T.O. children are much better spellers."

k. "Fair."

l. "Some of the i.t.a. spelling is not up to par."

m. "As good as T.O.

n. "i.t.a. above average spellers."

o. "i.t.a. children had more errors--possibly due to greater range of vocabulary.

Generally, the comments in this area do not seem to reflect a superiority for either group. A few of the teachers report that their i.t.a. children are better spellers, but this is counteracted by a few who feel that T.O. children are better spellers. The vast majority of the teachers feel that there is very little difference among the children in their spelling ability.

The final area in which comments were elicited was in relation to vocabulary development and use. The comments of the teachers in this area were:

a. "Vocabulary recognition better with i.t.a. but understanding the same."

b. "Most have fairly good vocabularies and are not hesitant to use it in writing or in oral discussion."

c. "Neither group uses their vocabulary in their daily speech."

d. "No difference."

e. "i.t.a. children are better."

f. "Greater among i.t.a."

g. "Good to excellent."

h. "i.t.a. children develop their vocabulary and seem freer using it every day in creative writing."

i. "i.t.a. child shows greater vocabulary development and enjoyment in use."

j. "Use many more words with ease."

k. "Much advanced among i.t.a. group."

l. "Favor of i.t.a."

m. "Bright and average children do better regardless of medium of original instruction."

In addition to the above comments, there were about ten more additional comments stating that there was no difference or no appreciable difference among the i.t.a. and T.O. children in this area. The comments generally seem to favor the i.t.a. group in terms of vocabulary development and use. Looking at the teacher questionnaire in its totality does not seem to reveal the same high degree of positive reaction to i.t.a.-trained children that was observed among first-grade teachers when the questionnaires were answered two years ago. It is important to note, however, that the third-grade teachers responding to this questionnaire were not teaching in i.t.a. in the classroom, and virtually all of the children whom they were instructing had made transition to i.t.a. previously.

Parents' Questionnaire

1. Did you know anything about i.t.a. before your child was in the study?

   yes 41% no 59%

2. Did the school acquaint you with i.t.a. prior to your child being assigned to an i.t.a. class?

   yes 83% no 16%

3. Was your attitude favorable?

   yes 78% no 20% 2%

The above three questions dealt with the parents' knowledge of i.t.a. prior to the beginning of the study, the effect of presentations explaining the medium, and their attitude that resulted from these meetings. As can be seen in the above questions, most of the parents were not aware of i.t.a. prior to the beginning of the study although after having attended an orientation meeting, over three quarters of the parents were favorable toward having their child instructed in the medium.

4. After your child's first-grade experience with i.t.a., did you agree with the reasons given for using i.t.a. to teach your child?

yes 88% no 12%

The response to this question, which is answered two years after the fact, is fairly similar to the response obtained when the children had completed first grade.

5. Has your attitude changed from your attitude at the end of first grade?

yes 22% no 78%

6. Has your attitude become more favorable?

yes 61% no 38% 1% yes and no

7. Has your attitude become less favorable?

yes 19% no 80%

The attempt in questions 5 through 7 was to ascertain whether any attitudinal changes had taken place. As can be seen, only 22% of the parents had changed their attitude and it is this 22% that we are dealing with in questions 6 and 7. Thus, of the 22% whose attitude has changed, 61% report becoming more favorable and 19% as becoming less favorable. Thus, there would seem to be a fairly small degree of disenchantment with i.t.a.--approximately one in five parents whose attitude has changed (becoming less favorable). But of those who have changed their attitude, 61% have become more favorable. Thus, it would appear that there was a general acceptance of the program and that attitudes, when they change, become more favorable rather than less favorable.

8. Did your child experience any notable difficulty in making transition from i.t.a. to T.O.?

yes 16% no 84%

9. Was your child ever seriously disturbed by seeing words written in the regular alphabet?

yes 10% no 90%

10. Did your child ever revert back to i.t.a. spelling after making transition?

yes 47% no 48% occasionally 5%

11. Has your child experienced any noticeable difficulty in spelling since making transition?

yes 14% no 86%

Questions 8 through 12 basically deal with transitional effects and the effects of learning in a medium which is unlike that normally used in the child's environment. Generally, their reactions seem to suggest that children do not have a marked difficulty in transition, that they are not disturbed by learning in a medium different from that of their environment, and that there is not a noticeable problem in spelling in traditional orthography when the child has made transition from i.t.a. Approximately half of the parents report that their children did occasionally revert back to i.t.a. in attempting to spell words after they had made transition. However, the results in question 12 suggest the fact that occasionally reverting back to i.t.a. and spelling words which the child perhaps is unable to spell in traditional orthography, has not had any noticeable effect on the child's spelling ability from the parents' point of view.

12. Do you think your child reads better than ______, as well as ______, or worse than ______ he would have had he been taught by traditional orthography?

Sixty-three percent report better than, 28%, as well as, 7% worse than, and 3% report no way of knowing. The response to this question suggests an overwhelming acceptance of the i.t.a. medium of instruction in reading, since 91% of the parents feel their child reads at least as well as he would have read had he been instructed in traditional orthography. Close to two thirds of the parents report that their child reads better than he would have had he been instructed in traditional orthography. Most of these parents have had other children in school and do have some basis for comparing progress made by the child. However, since children have an infinite number of individual differences, this kind of a comparison is difficult and mainly reflects the fact that the parents are favorable toward i.t.a. instruction. It does not, of course, mean that this was actually the case. The children do read better than those instructed in traditional orthography.

13. Do you think your child spells better than ______, as well as ______, or worse than ______ he would have had he been taught by the regular alphabet?

Twenty-nine percent report better than, 57% as well as, 13% worse than, and 3% no way of knowing. In this situation, 86% of the parents feel that children instructed in i.t.a. spell at least as well as those who were instructed in T.O. However, the fact that only 29% of the parents feel their children spell better than they would have had their instruction originally been in traditional orthography, this attitude reflects the fact that parents do not feel that spelling is one of the prime advantages of i.t.a. instruction. However, they also seem to feel that their child has not been significantly harmed in spelling as a result of being instructed in i.t.a.

14. Does your child pick up books voluntarily, and does he derive pleasure from reading?

yes 94% no 5% 1% occasionally

The answer to this question would suggest the fact that when children are instructed in a regular medium it eases the learning process and develops more favorable attitudes toward the reading act. The fact that i.t.a. is an easier medium in which to learn was verified in earlier reports when children were instructed in i.t.a. and then tested in the i.t.a. medium. When tested in i.t.a., children generally are performing better in decoding skills at the middle of first grade than are children who were instructed in traditional orthography and whose reading is measured in traditional orthography. These parents obviously feel that their children do like to read and do pick up books voluntarily around the house.

15. Does your child voluntarily write at home?

yes 79% no 21%

16. Does your child write as much after transition as he did when he was still being instructed in i.t.a.?

yes 82% no 15% 1% yes and no

In the previous years of the study, teachers have reported a dramatic and significant increase in children's writing when they are instructed in i.t.a. Almost 80% of the parents report that their child does write voluntarily at home and 82% report that the child's desire to write and ability to write did not lessen after transition. This seems to reflect the fact that the parents not only view i.t.a. as a successful medium for the teaching of reading but that it also promotes written communication as well.

17. Do you feel your child has had a happy experience learning with i.t.a.?

yes 91% no 9%

This would seem to suggest that the problem originally envisioned did not materialize in the area of an inconsistency between the child's medium of learning and the medium of written symbols utilized in his total environment.

18. If you had a second child entering first grade this year and you had a choice of i.t.a. or reading by the conventional orthography, would you want him assigned to an i.t.a. class?

yes 81% no 19%

Hence, four out of the five parents whose children were in the i.t.a. experiment would prefer having their other children instructed in that medium. This question does not ask, "Would you accept placing the second child in an i.t.a. class," but whether this would be the parent's first choice. An overwhelming number of parents report in the affirmative. Despite the fact that some of the individuals in the 19% would really have no preference at all there are still a sizable number in that percentage who did not feel that i.t.a. was beneficial. This would strongly suggest that introducing reading to all children in any school in the i.t.a. medium is not perhaps the most desirable procedure. If approximately one out of five parents would not be happy having their child instructed in i.t.a. it would seem advisable to maintain some classes in traditional orthography so that children who are highly mobile and may move may be instructed in traditional orthography as well as those children of parents who are unfavorable toward i.t.a. as the medium of instruction.

On question 19, parents were asked to comment on their child's attitude toward reading, writing and any other observations they may make now that their child has completed third grade. One parent responded with the letter reprinted below. Following the letter are the parents' comments in their entirety on the child's attitude toward reading:

> "I feel I must comment on my answers to 5, 6, 7, and 18. I was fortunate to have a child who not only wanted to learn but an average or better than average ability to learn. However, I know of several families whose children did not have the ability, or better phrased, were slower at learning, and these children have had and will continue to have much difficulty in the i.t.a. program. If there were a way to judge or test a child's ability for learning it would be better. To try to teach a child who is slow at learning 44 symbols and then change it seems cruel. For this child i.t.a. is just an added stumble stone which is hard to kick out of the way. It is also an unnecessary and unneeded stumble stone. I have three children. Two were on the T.O. program, one had i.t.a., they are all on their correct reading levels. They all received a B or better in their oral reading and comprehension and word attack skills. I must say that the one who had i.t.a. enjoys reading more than the other two. She will often pick up a book and read where the other two must be given an assignment before they will. If I knew that a child of mine was going to have the success that she had I would say, yes give her (or him) i.t.a."

a. "Enthusiastic, pleasurable and rewarding."

b. "Does not hate reading but he isn't crazy about it either."

c. "Enjoys reading."

d. "Enjoys reading very much even when learning i.t.a. in 1st and 2nd grade--did a lot of reading in regular T.O. books."

e. "Enjoys reading his own choice of material."

f. "Excellent."

g. "Enjoys reading very much. Reads to me occasionally."

h. "She enjoys reading and derives much pleasure from it."

i. "Likes to read."

j. "Enjoys reading very much. Sounds out words she doesn't know."

k. "He likes reading and he would have anyway."

l. "She reads more than she normally would."

m. "He loves to read, reads fast and understands what he's reading; the i.t.a. has made reading pleasurable."

n. "She enjoys reading and she has a broad range of interest--from fiction to biography, etc."

o. "On her own will go to public library for stories to read."

p. "Loves to read. There isn't a day that goes by that she doesn't read."

q. "Loves to read."

r. "Very stimulated thru i.t.a."

s. "Likes to read."

t. "He likes to read providing he can recognize and pronounce the words of the subject reading matter."

u. "Has no great appreciation of reading. A sister in second grade reads far better and much more on her own."

v. "She has a very good, healthy attitude. She enjoys reading to the fullest."

w. "Very favorable--enjoys reading on her own."

x. "Very good!--likes to read."

y. "Enjoys reading."

z. "Has been much advanced."

aa. "Gets mixed up with the words."

bb. "I feel as if i.t.a. was stopped too soon."

cc. "Her attitude toward reading is favorable."

dd. "As a parent and teacher I would like to see i.t.a. continued."

ee. "My child loves to read."

ff. "Good."

gg. "Will attempt anything."

hh. "I feel she does attempt to read books with unfamiliar words without the reluctance children taught by traditional methods occasionally show."

ii. "Not interested in reading for pleasure--reads only for school work."

jj. "He enjoys reading."

kk. "Enjoys."

ll. "My child enjoys reading and reads frequently and goes to the library to read also."

mm. "Only science reading."

nn. "Favorable--reads often."

oo. "I do hope that John will follow-up good."

pp. "Likes to read subjects in which he is interested."

qq. "Good."

rr. "Excellent."

ss. "Enjoys reading."

tt. "The desire to read is overwhelming!! The amount read is "unbelievable" and the grade level is way ahead."

uu. "He enjoys reading on subjects he is interested in--baseball and other sports."

vv. "Voluntary and excellent."

ww. "My third grader was thrilled with his new-found skill in first grade and read as much as he could. In second grade his interest waned and it is just recently that there is renewed interest. My second grader reads all the time and remembers what she reads."

xx. "She loves to read. Picks up books without being reminded. Her teacher's attitude has made reading very enjoyable for her and not a chore."

yy. "She enjoys it tremendously, has her own favorite authors and is very proud of her own book collection."

zz. "He does not read voluntarily."

As can be seen from the above comments, most parents report extremely favorable attitudes toward reading, but this does not negate the fact that a few of the comments were not positive and there were a few responses that were definitely negative.

The following are the comments in their entirety on the child's attitude toward writing:

a. "Eager."

b. "Attitude toward writing what?"

c. "Likes to write but needs more practice."

d. "Loves to write--I feel i.t.a. helped her by letting her spell any words."

e. "Only when necessary--homework, etc."

f. "Excellent."

g. "She enjoys creative writing and seems sure of her vocabulary and spelling."

h. "Enjoys writing letters to a few cousins and friends."

i. "Fair."

j. "Writes with no effort or problem. Seldom asks how to spell a word. Figures it out for herself."

k. "Very poor--it seems to be a chore for him."

l. "When writing i.t.a. she expressed her thoughts easily, now with the transition to T.O. her spelling hinders her and she does not write as well and as freely."

m. "He writes stories and has quite an imagination."

n. "She enjoys writing letters to relatives, sometimes writes poetry."

o. "It seems to me that writing something original does not become a chore for her."

p. "Likes to write."

q. "More imagination and freedom. Not afraid to write a word he cannot spell."

r. "He does nicely putting down his thoughts even though the spelling is not always correct."

s. "By and large enjoys it. Does not write as freely as 2 years ago, however, she knows too much now."

t. "He expresses himself better in writing but has trouble with his spelling because of i.t.a."

u. "The opposite is true in writing. He derives pleasure in writing and does considerable on his own."

v. "She has an avid interest in writing stories."

w. "Favorable--likes to write letters."

x. "Very satisfactory."

y. "Average."

z. "Not too favorable."

aa. "Finds no problems and is venturesome."

bb. "He had a slight bit of trouble with some words from i.t.a. to T.O."

cc. "Her attitude toward writing is very favorable."

dd. "These 8 year olds love to write--and play school at home."

ee. "Good."

ff. "Does as well as I could expect."

gg. "Loves to write and writes very well, has a good imagination and can put it on paper."

hh. "He enjoys writing."

ii. "Always writing--very expressive--from poems to menus."

jj. "My child enjoys writing, he writes stories and makes reports on what he read."

kk. "Bad penmanship."

ll. "Enjoys writing very much."

mm. "Favorable--writes frequently at house."

nn. "No noticeable change."

oo. "Good--enjoys writing."

pp. "The creativity is also another result of i.t.a. They can write more and the desire to write is great because of the vocabulary gained."

qq. "He writes thank-you notes for gifts and other than school assignments is not interested in creative writing."

rr. "Appears normal and uninhibited."

ss. "My third grader is rather timid with the written word and on the other side of the scale, my second grader shines in both areas."

tt. "She thinks writing can be fun and again her teacher has made it very interesting for her. The topics that she has used has given her the incentive to write."

uu. "Her comprehension is normal, depending upon her interest derived from the book."

vv. "Not too interested in writing."

ww. "He does not write anything other than his homework."

xx. "When she has the time, she loves to write."

yy. "Excellent."

zz. "Poor."

As can be seen in the above comments, most of the parents feel that the child's attitude toward writing is positive. The number of negative comments are small; perhaps a little higher in number than negative attitudes seen in the parent's report of the child's attitude toward reading.

The following are comments in their entirety on the parents' other observations:

a. "Has given sound basis and positive attitude towards all reading."

b. "Good for some children, not good for others."

c. "Eager to do all school work."

d. "I believe i.t.a. made reading more interesting and exciting for Keith. Words are more easily read and less frustrating to the beginning reader."

e. "She is able to read new words easily and no matter how difficult they may seem she seems secure in figuring them out."

f. "He is No. 5 of 6 children and the only one to show such difficulty in spelling. I do not want his younger brother in first grade to experience such difficulties."

g. "Her spelling gives her difficulty."

h. "Even though she was 'acquainted' with the T.O. alphabet prior to first grade, she did not seem confused by the new characters."

i. "I believe her teacher had a lot to do with making her an excellent student, as well as the i.t.a. program."

j. "The above is true because he can read more subject matter than a child not having had i.t.a."

k. "Certainly of 4 children this one is my only reader. And when she was younger she loved to write 4 and 5 page stories. I think giving the technical ability to write whatever they wish for young children is the greatest asset of i.t.a."

l. "He seems to be making better progress now than at the beginning of the year."

m. "There is poor expression in his reading. He seems to be reading the words but not understanding the message. Monotone--halted."

n. "I don't know if i.t.a. helped develop it but her imagination is superior when it comes to writing a story or composition."

o. "Reading scope is tremendous."

p. "She is very proud that she is able to read well."

q. "We find the basic conception of being able to read all important."

r. "I hope they teach i.t.a. to my child entering kindergarten soon."

s. "The children enjoy reading and in my opinion it is the result of i.t.a."

t. "The only 'difficulty' my child encountered with i.t.a., I feel, was some with the transition. I feel first grade was too soon for it."

u. "People from other schools noticed she could read well very young. Some were amazed."

v. "I suspect i.t.a. will be of most use to those children who exhibit discouragement at the complexity of our traditional alphabet."

w. "This son started i.t.a. program in kindergarten. Second son started in first grade. First son was just as ready to read in kindergarten as he would have been in first grade. By first grade could write excellent stories. I feel i.t.a. program should be started in kindergarten."

x. "i.t.a. encourages the beginning reader--and once begun the sky's the limit."

y. "I think i.t.a. has also helped his spelling because he tries to spell word out."

z. "Social Studies."

aa. "In learning i.t.a. the difficulty was with friends, relatives that didn't know i.t.a."

bb. "Reads and writes more at this age than older child trained in traditional orthography--at the same age."

cc. "I feel that through the use of i.t.a. my child reads better and comprehends better than his older brother at a comparable age."

dd. "Good creative writing."

ee. "Both poor and good readers do better in i.t.a. classes. Have two children in i.t.a. classes and both like i.t.a. program."

ff. "i.t.a. is a boon to the beginner! It is a marvelous incentive and has helped my child learn faster in religious training because of the ability to read faster."

gg. "He can tackle any word phonetically without fear of not knowing the word."

hh. "My child, I believe, would have been a good reader under either alphabet but I think progressed even more rapidly under i.t.a."

ii. "I firmly believe that i.t.a. is an excellent method of introduction to word handling."

jj. "It would seem that if a child is going to do well it doesn't matter what method is used. However, I do feel that i.t.a. gives the beginner a certain sense of security and freedom not found in T.O. i.t.a. is 'consistent' and there are no exceptions to the rules. Therefore, by the time they're ready for the transition, the children usually have acquired the necessary confidence."

kk. "At one time I did think spelling was a problem but when told she was reading beyond her grade level as well as writing above level she was using words she hadn't become acquainted with on her spelling lists."

ll. "Her comprehension does not measure up to her reading ability. She has been able to read just about anything from the very beginning of her i.t.a. experience but she does not always understand what she is reading, but she is not always able to express it in her own words."

mm. "A love for books and a mature vocabulary for her age."

nn. "Should be more emphasis on spelling during transition--appears to be only difficulty with i.t.a."

oo. "I believe i.t.a. is a great system and I believe my two children who have had it are better students because of it."

pp. "I can't say whether she would enjoy reading with less enjoyment if she were taught with the regular alphabet."

qq. "None."

The above comments also are overwhelmingly favorable. Again, as would be expected, those parents whose children encounter difficulties seem to be least favorable toward i.t.a., and it is perhaps just as dangerous to say that these children would have had difficulties whether they had been instructed in i.t.a. or not, as it is to say that those children who succeeded extremely well succeeded as a result of i.t.a. and would not have been equally successful had they been instructed in traditional orthography.

The attitudes expressed by the parents in their questionnaire are far more favorable than the attitudes of the research officers, administrators and teachers. It is true, of course, that teachers, administrators and the research officers are in a better position to make comparisons than are parents, but it is still the parents who have had an opportunity to observe their children carefully over a long period of time. The favorable attitudes expressed by the parents certainly suggest that the i.t.a. program has been successful, in their view, and they would like to see it continued. The high percentage of parents who prefer that their other children be instructed in i.t.a. is certainly a strong indication of their favorable opinions.

These questionnaires are imperfect. The observations and opinions expressed by all those who answered any of the questionnaires are obviously colored by their own feelings and attitudes; many of them perhaps perceiving what they prefer to perceive so that one should not attribute any scientific accuracy to the results obtained. The results do seem to suggest, however, that problems will still exist whether instruction takes place in i.t.a. or in T.O. so that i.t.a. is certainly no panacea for all reading ills. Despite the fact that it has been unsuccessfully attempted in other studies, it is important that more studies be done to determine whether there are some procedures by which children could be diagnosed prior to beginning reading instruction to determine which children would be placed more advantageously in an i.t.a. program. The results are here for the reader's perusal and although certain conclusions are made following certain sections of the question, these conclusions are highly tentative and should not be considered as actual fact.